

# COMPUTERWORLD

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**Netview upgrade pricing** proves too tangled a web for users to figure out individual costs. Page 117.

## VAX 9000 users on VIP list

BY MARYFRAN JOHNSON  
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp.'s VAX 9000 mainframe arrives at its 1-year-old mark this week, its reputation a bit tarnished by shipping delays but with sales into commercial accounts coming on stronger than DEC officials said they expected.

The company is also exhibiting an increasingly IBM-like reputation for customer service in mainframe accounts.

From jetting replacement disk drive controllers into Muncie, Ind., at 2 a.m. to stationing three DEC employees at a new mainframe customer site, DEC seems determined to do whatever it takes to keep these users content.

"It was worth the wait," said Michael Guider, vice-president of network and information services at Litel Telecommunica-

tions Corp. in Columbus, Ohio, which received one of the first VAX 9000 Model 210s. "DEC's ability to resolve problems has been outstanding."

During DEC's first fiscal quarter from July through September, the company said it delivered 76 mainframes, mainly

low-end Model 210s but including a handful of 410s and 420s. Two-thirds of them landed in commercial applications, while the remaining one-third found a home in technical or scientific uses — just about the reverse of what DEC officials had expected.

*Continued on page 8*

## Revenge of the mini makers

	Processor	Memory	Disk	Price
NCR 3445 (entry)	1 x 486	4M bytes	327M bytes	\$20,495
DEC AD 433MP (entry)	1 x 486	8M bytes	209M bytes	\$17,500
NCR 3345	1 x 486	64M bytes	680M bytes	\$54,185
DEC AD 433MP	1 x 486	64M bytes	618M bytes	\$45,960
NCR 3445 (high-end)	1 x 486	64M bytes	3.3G bytes	\$84,785
DEC AD 433MP	2 x 486	64M bytes	3G bytes	\$78,517

All I486 chips in this table are 33-MHz  
Source: Gartner Group, Inc.

CW Chart: Doreen St. John

**DEC last week became the latest vendor to offer up Intel-based multiuser Unix systems, with prices undercutting NCR's recent 3000 line. Story, page 8.**

## Repository, Systemview teams take separate paths

BY ROSEMARY HAMILTON  
CW STAFF

CHICAGO — Two of the strategic architectures IBM has designed for key roles in its enterprisewide management scheme do not adhere to a consistent data model, IBM officials conceded last week.

Systemview, the recently announced architecture for data center operations and systems management, does not conform to the entity relationship structure of Repository Manager/MVS, the key software component of the AD/Cycle application development architecture, the officials confirmed. While there is little short-term impact for users, the long-term implications could be significant for any user who hopes to unite the two environments someday.

IBM's stated goal is to provide a repository-based world that integrates information concerning various data processing activities, including application development and systems management.

AD/Cycle, announced in September 1989, is IBM's plan for an integrated application development environment. An initial version of Repository Manager/MVS was released earlier this year and is installed at a small number of select customer sites. Systemview was rolled out as part of the System/390 announcement last month. IBM is scheduled to release initial

*Continued on page 116*

## USAF computer crime unit flies solo

BY MICHAEL ALEXANDER  
CW STAFF

WASHINGTON, D.C. — On Feb. 20, 1989, U.S. Army Specialist Four Michael Peri, then 21, slipped into East Germany toting a stolen laptop computer and four disks containing classified information about the deployment of tanks and helicopters along the boundary between the two Germanys.

When Peri returned 12 days later, he confessed to being absent without leave but denied that the laptop, which he brought back, had contained military secrets. Hard-pressed to find enough evidence to prosecute Peri for espionage, Army authorities asked the Air Force

Office of Special Investigation's unique computer crime unit to look at the laptop. The Army had no special agent in Europe who was trained to analyze computer equipment for evidence.

"It appeared at the time [that Army investigators] were stymied and unable to prove anything," said Lt. Col. William T. Cobb, chief of directorate investigative support at AFOSI, headquartered at Bolling Air Force Base in Washington, D.C.

The AFOSI computer crime unit dispatched one of 12 computer crime investigators that it keeps stationed at Air Force

bases around the globe to Fulda, West Germany, where Peri was stationed. There, the investigator unearthed sensitive information stored in hidden files in the laptop and on the disks. In June 1989, Peri was convicted of espionage and sentenced to 30 years in prison.

The Peri case illustrates that with the exception of the Air Force, which operates the only military agency assigned

solely to investigating crimes involving computers, the military seems ill-prepared to cope with computer-related crime. Special agents that are employed by the

*Continued on page 115*

## Japan gets first look at IBM 486

*U.S. intro promised before Comdex/Fall*

BY RICHARD PASTORE  
CW STAFF

In what may be a sign of the growing market clout of Japan, a major IBM product was unveiled in Japan weeks before the expected U.S. debut of similar systems. Japanese versions of the long-rumored Personal System/2 Model 90 and 95 servers were made public earlier this month by IBM's Japan office.

Boasting about IBM's decision to unveil such key products in Japan first, IBM Japan Ltd. Vice-President Nobuo Mii announced two Intel Corp. I486-based models and added that the I486-based PS/2s will debut in the U.S. before Comdex/Fall '90 next month.

According to *Computerworld Japan*, Mii described a floor-standing system with a 33-MHz I486 chip that incorporates IBM's Micro Channel Architecture. The unit can be configured with 4M to 16M bytes of memory and 160M-byte or 320M-byte hard disks. A 25-MHz desktop model offers the same bus, memory and drive options.

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## Quotable

**"In 1992, when they have the United States of Europe, they are going to start acting like a cohesive group of states."**

WILLIS WARE  
RAND CORP.

On international computer security efforts. See story page 115.

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# EXECUTIVE BRIEFING

■ **IBM's top-of-the-line Personal System/2** has been introduced in Japan, marking the first time an IBM product of such importance has hit Japan before it has hit the U.S. The Model 90 and 95 file servers, which are based on the 33-MHz Intel I486 chip, are expected to debut in the U.S. before Comdex/Fall '90 next month. Although the U.S. pricing structure will be different, the basic hardware configuration should be similar. **Page 1.**

■ **Congress has criticized the Resolution Trust's information system** as inadequate. Legislators say the corporation that was created to clean up the savings and loan crisis has failed to form a cohesive information or systems acquisition strategy. They say they are concerned that the inadequate IS strategy will be unable to provide Congress with sufficient data to judge the success or failure of its crisis resolution efforts. **Page 117.**

■ **IBM's Systemview and Repository Manager architectures** are not fully compatible from a data management standpoint, IBM conceded. The inconsistency poses a potential long-term problem for AD/Cycle users seeking enterprisewide data sharing. **Page 1.**

■ **After 20 years, AFIPS will dissolve itself** at the end of the year. One director admitted that the society "has outlived its usefulness" since the demise of the National Computer Conference in 1987. **Page 4.**

■ **Quarterly financial results** found that Lotus and Apple profits are falling to the ground, DEC is inching up from its earlier loss, and IBM is healthy — but with question marks. **Pages 7, 8, 12 and 116.**

■ **Charles H. Mayer, First Boston's new CIO**, says he hopes to decentralize applications development among the investment firm's four business units. Like many others, the company is seeking competitive success through business rather than technology breakthroughs. **Page 67.**

■ **The U.S. armed forces seem to be ill-prepared** to cope with computer-related crimes. To investigate a major espionage case, for example, the Army had to turn to the Air Force for help. Officials question whether the military can deal effectively with threats from both internal hackers and foreign agents. **Page 1.**

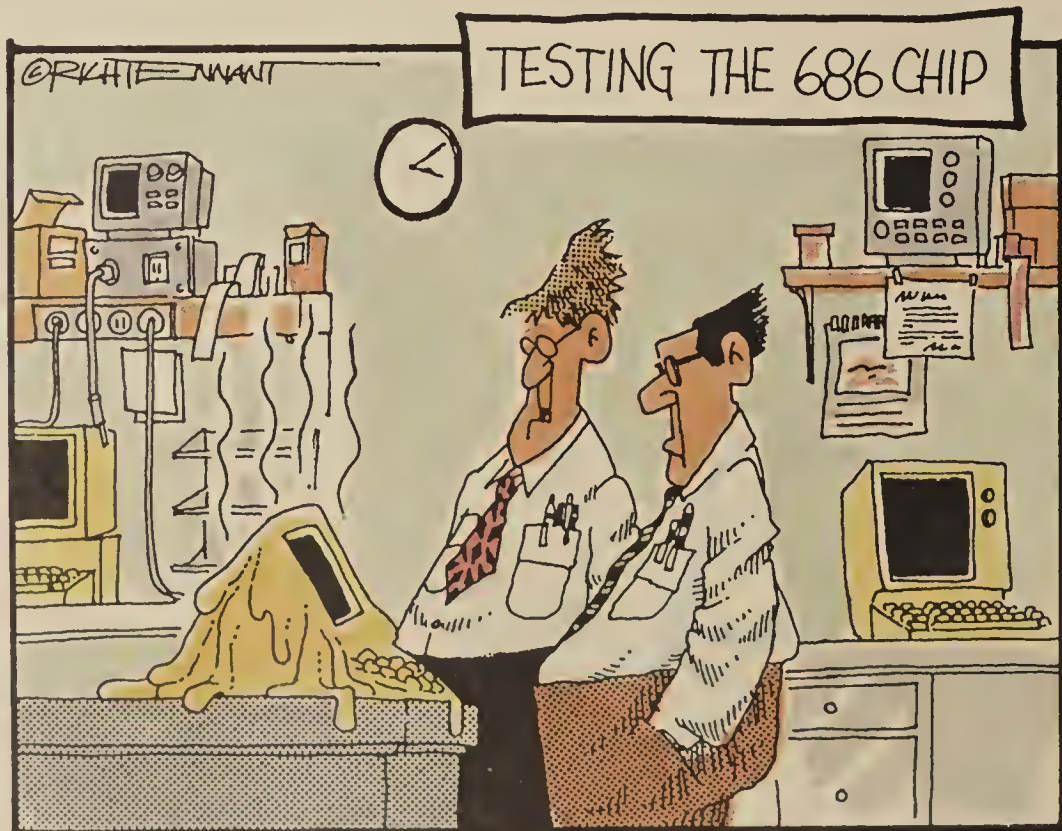
■ **Thanks to new connectivity features**, IBM's Netview is becoming viable in multivendor environments. However, Netview/PC users such as Aetna, GE and Union Pacific say the network management system is fine without the new interfaces. **Page 53.**

■ **Reviews are mixed for Unix** playing on the corporate desktop. The operating system is getting raves from some users for its high speed and low cost, while big names from the DOS applications world are beginning to pop up in Unix. The trouble is, users say that the old favorites don't seem to be quite the same in the new setting. **Page 77.**

■ **Colleges look to IS directors** to teach information systems management, but there are obstacles and drawbacks to choosing the professional career track. Obtaining a Ph.D., taking a hefty pay cut and facing a roomful of students are but a few. **Page 99.**

■ **On-site this week:** Networked PCs are serving as telephones for deaf students at Gallaudet University in Washington, D.C. They are also a major classroom learning tool. **Page 43.** Forty years' worth of paper records will eventually be converted to a Wang imaging system at EG&G's nuclear research facility in Idaho Falls, Idaho. In an unusual twist, the Wang system will be connected to an IBM 3090 Model 200. **Page 29.**

## The Fifth Wave



"IT'S FAST ENOUGH FOR ME."



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	VSAM		✓
	TOTAL		✓
	CA-IDMS		✓
	CA-DATACOM		✓
PORTABILITY Runs identically on...	MVS		✓
	MVS/XA	✓	✓
	MVS/ESA	✓	✓
	VSE		✓
	VM		✓
	PC-DOS		✓
	PC LAN		✓
STANDARDS	ANSI SQL	✓	✓
	FIPS	✓	✓
	SAA	✓	✓
	NAS		✓
DISTRIBUTED DATABASE	Remote Request	✓	✓
	Distributed Request		✓
	Replication		✓
	Partitioning		✓
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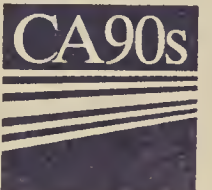
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*What are you waiting for?*



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# IBM mulls successor to VGA

BY MICHAEL FITZGERALD  
CW STAFF

IBM has developed a powerful successor to its Video Graphics Array (VGA) personal computer display standard but is apparently still struggling over what to do with it.

Sources who have attended demonstrations and briefings on the unreleased Extended Graphics Array (XGA) controller say the 16-bit video card is well-positioned to succeed both the 4-bit VGA and the more expensive 8514/A controllers at the top of IBM's graphics line. XGA will reportedly give users better resolution, a faster screen refresh rate, substantially reduced flicker and far better color display than VGA.

However, sources said IBM is still debating whether to announce XGA as a commodity in its Personal System/2 Model 90 and PS/2 Model 95 machines or position it as an expensive high-end option for graphics-intensive applications. IBM announced Japanese versions of the Models 90 and 95 in Japan earlier this month and said they would be announced in the U.S. before Comdex/Fall '90 begins on Nov. 13 (see story page 1).

Sources who have seen XGA demonstrations said it has the following features:

- Options for 1,024- by 768-pixel and 1,280- by 1,024-pixel resolution. VGA resolution is 640 by 480 pixels.
- A 70-Hz screen refresh rate.

- 16-bit color, allowing as many as 32,000 colors to be displayed at once on-screen from a palette of 16 million colors.
- Upward compatibility with VGA.

Sources said that if XGA comes installed on the motherboard of the new PS/2, it will almost certainly become the new PC graphics standard.

Insiders reported that the most serious internal debate in IBM is whether to keep XGA on the motherboard of the Model 90 and 95.

Those who have seen the product said it has always been demonstrated on a PS/2 motherboard. However, they conceded that IBM might also release XGA as, in essence, a replacement for the 8514/A, IBM's current high-level PC graphics card. The 8514/A, which IBM once positioned as a VGA successor, is languishing with 1% to 2% of new graphics card sales, compared with 78% for VGA and compatible cards, according to Dataquest, Inc. in San Jose, Calif.

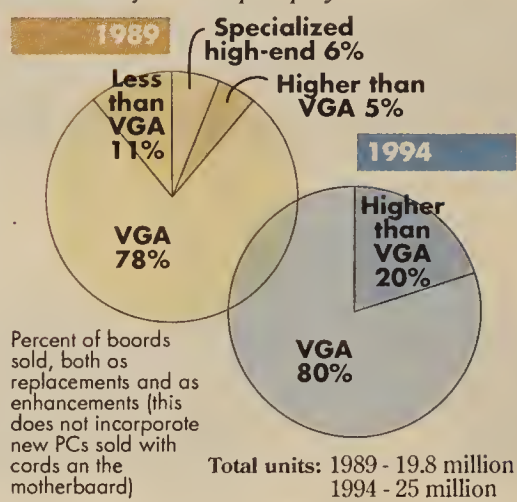
If sold separately, XGA could become a must-have product for computer-aided design and manufacturing, high-end imaging and desktop publishing users, but it would probably be much more expensive. Few other users would be able to justify spending

the money needed for XGA, just as they have balked at spending more than \$2,000 for the combined 8514/A, VGA-compatible card and related monitor. A VGA card with a monitor costs as little as \$400.

If IBM releases XGA on the motherboard of its new high-end

## What's in a picture

IBM Video Graphics Array boards dominate the market for desktop display cards



Source: Dataquest, Inc.

CW Chart: Marie Haines

machines, "what that means for all of us in the industry is a new video display standard," said Henry Quan, director of marketing for Scarborough, Ont.-based ATI Technologies, Inc.

However, the standard would take some time to seep down from the high end to general machines and also to drop in price, in much the same way as VGA did when it was introduced in 1987, sources said.

"Assuming XGA was VGA-

compatible and it was shipping today, it's at least a two- to three-year process for a new graphics standard to replace the old one as a standard," said Robert Harshman, president of Zeek Corp., a PC graphics firm in Chicago.

XGA is also expected to spearhead IBM's push into multimedia, and this is what is driving the increase in performance.

With 16-bit color, screen displays will offer what is called "perfect video." Perfect video means that the human eye cannot tell the difference between it and true 24-bit color, such as can be seen in a photograph.

By releasing the product at 16 bits, IBM will gain much better hardware performance levels than it would with a 24-bit specification.

"Twenty-four bits of color only slows down performance and adds an extra megabyte of RAM to the cost of the computer, and how many color printers are in the market?" asked Edward Schaidler, vice-president of marketing at Genoa Systems, a major VGA board maker.

Some observers doubted XGA will do much to remove VGA from its position as the graphics standard until prices fall.

"Will it impact VGA substantially? My gut feeling is no, because it's higher end and high cost," said Jim Anderson, director of graphics marketing at Headland Technology, Inc. and chairman of the Video Electronics Standards Association. "If [IBM's] pulled off a higher-resolution card at low cost, then it will be great, and we'll all do it."

## AFIPS votes itself out of existence after 20-year run

BY PATRICIA KEEFE  
CW STAFF

RESTON, Va. — The members of the American Federation of Information Processing Societies (AFIPS) voted unanimously last week to dissolve the 20-year-old organization, effective Dec. 31.

Assets of \$1.4 million will be divvied up among the 17 societies that make up AFIPS, based on a formula laid out in the by-laws. Through these societies, AFIPS claims a constituency of about 240,000.

There may be an effort among some society members to form a new society, said Dennis Bybee, who represents the International Society of Technology in Education (ISTE) within AFIPS.

The dissolution issue was first broached by ISTE last April [CW, April 10], which almost immediately found its membership under question.

ISTE comprises two former societies, and there was a question as to whether the combined entity needed to reapply to join, even though AFIPS had already accepted its membership fees. Last week, the AFIPS board reinstated the group, Bybee said.

In April, both the Institute of Electrical and Electronics Engineers, Inc. and the Association of Computing Machinery (ACM) countered the ISTE bid to dissolve AFIPS with a plan to buy out any disinterested parties and to remodel AFIPS into a government lobbying force.

Last week, the resolution to dissolve AFIPS originated from the six directors representing ACM and the IEEE Computing Society (IEEE/CS), according to T. Michael Elliott, executive director of the IEEE/CS.

"I think it's true" that AFIPS has outlived its usefulness, said Elliott, who is serving on the committee charged with dissolving AFIPS.

## Japan

FROM PAGE 1

The U.S. dollar equivalent of the Japanese pricing ranges from \$13,400 to \$17,420, depending on model and storage options. The desktop model began shipping last week, and the 33-MHz box is slated to ship next month.

Though the Japanese machine pricing is probably not indicative of U.S. pricing, the hardware specifications are another matter, analysts said. "These gross specs are probably going to be identical right down the line," said Tom Comerford, an analyst at Datapro Research Corp. in Delran, N.J.

Observers originally thought IBM would deliver two I486-based machines dubbed the Models 90 and 95 by early this month. Industry analysts have speculated that complications in Federal Communications Commission certification or availability of a 33-MHz version of the I486 chip have pushed the expected release date back to at least the last week of this month.

IBM spokesman Matt Jeffrey would not comment on unan-

nounced U.S. products but said the Japanese PS/55 personal computer line parallels the U.S. PS/2 line "quite closely." The two lines are growing more similar in architecture at the high end, he added.

The fact that Japan led with a server announcement indicates the growing importance of that market as well as the increased autonomy afforded to IBM divisions, said Sam Albert, an IBM analyst and president of Sam Albert Associates in Scarsdale, N.Y.

Though IBM divisions have been increasingly encouraged to take aggressive initiatives, Albert said the Japanese would not have made the announcement without corporate consent.

"The initiative of the Japanese office has increased," Mii told *Computerworld Japan*. He added that some IBM PC products will be announced first in Japan in the future.

Mii also noted IBM's OS/2 Version 1.3 would accompany the PS/2 introductions in the U.S. He also speculated on an upcoming laptop, which he said will be based on Intel's 32-bit 80386 or I486 processor.

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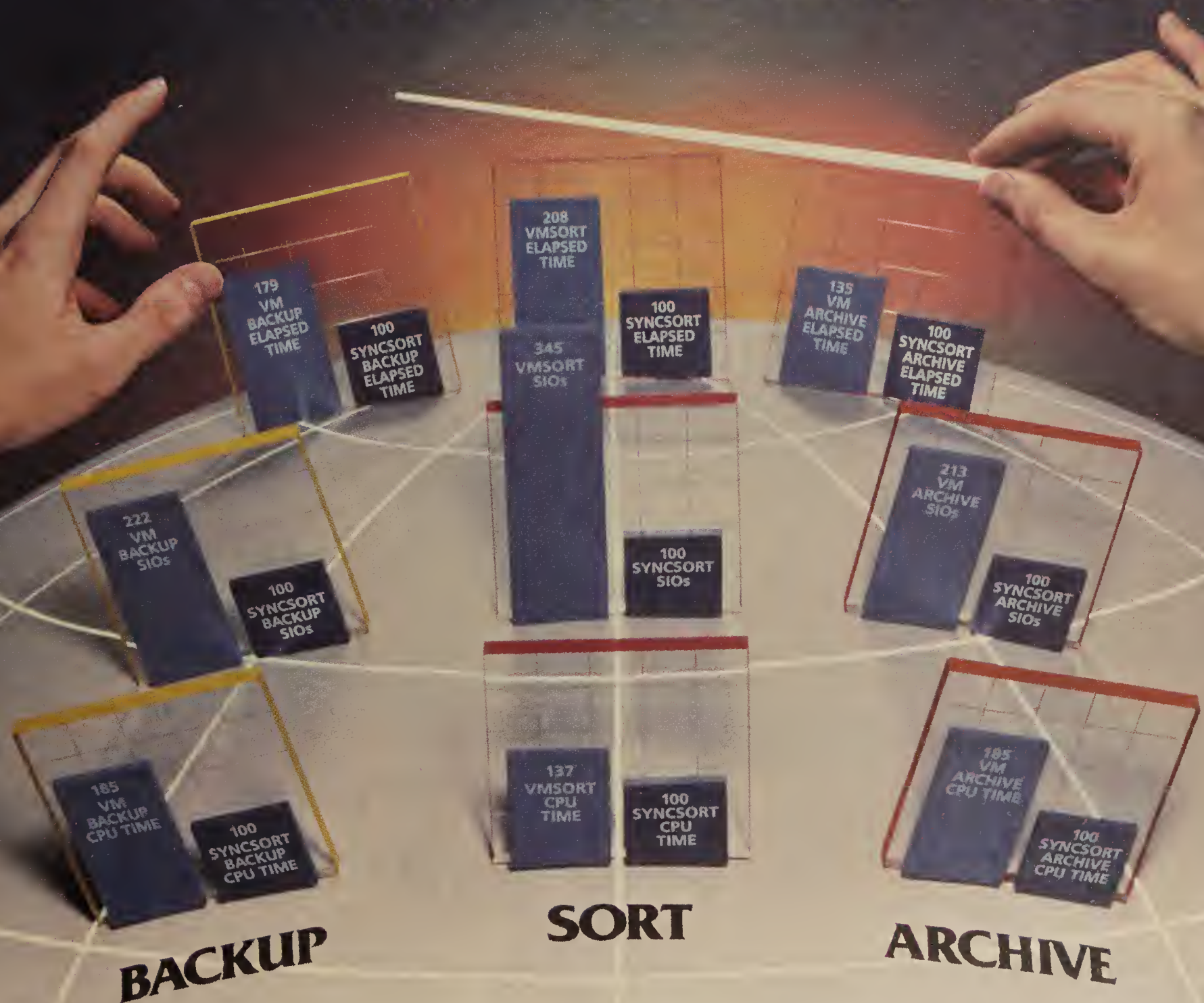
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## NEWS SHORTS

### Ingres adds gateways

On the eve of its planned merger with Ask Computer Systems, Inc. (see story this page), Ingres Corp. announced gateways between its relational database management system and two of IBM's relational databases, DB2 and SQL/DS. At the same time, Ingres updated its gateways to Digital Equipment Corp.'s RDB relational database. The gateways are intended to boost the use of Ingres in enterprisewide networks and mixed-vendor environments. Ingres gateways to nonrelational database systems — IBM's IMS and DEC's RMS — were also enhanced. Pricing for the DB2, IMS and SQL/DS gateways ranges from \$50,000 to \$400,000, depending on the size of the machine supported. Prices for the gateways to RDB and RMS range from \$2,500 to \$150,000.

### Silicon Graphics boosts low end

While Silicon Graphics, Inc. waits on the next generation of reduced instruction set computing processors from its supplier, Mips Computer Systems, Inc., it is taking steps to improve its low-end graphics workstations. The company announced an upgrade last week that takes a 16 million instruction per second (MIPS) or 10 MIPS processor-based Personal Iris workstation and, by increasing memory throughput, system bus bandwidth and clock speed, hits a performance level of 33 MIPS or 23 Specmarks for \$9,000, Silicon Graphics claimed. In other news, Silicon Graphics reported that net income for its first fiscal quarter was up 84% compared with the comparable period last year, rising from \$5.2 million to \$9.6 million. Revenue grew from \$86.4 million to \$115.8 million.

### Modest growth at AT&T

AT&T announced modest revenue and profit growth of 5% and 1.9%, respectively, last week for the third quarter. Net income would have been higher than the \$712 million posted but for the heavy launching costs associated with AT&T's new Universal Card credit- and calling-card combination. Product sales, which include computer systems and network products, rose 12.7% to \$3.08 billion largely on the strength of international markets, and revenue totaled \$9.66 billion.

### HP tiptoes into X.500

Trying to jump the gun on network directory X.500 standards, Hewlett-Packard Co. last week said it is shipping its X.500 addressing product. The company acknowledged that it was only shipping "core functionality" of the product to a selected group of fewer than 20 customers. The X.500 product acts like a distributed database with information on local network addresses so that local users can find addresses in other areas without having to go through a large central directory.

### Stephens named CEO at Emulex

Storage and networking products vendor Emulex Corp. tapped former Western Digital Corp. and IBM executive Robert Stephens as president and chief executive officer. A 20-year veteran of the industry, Stephens last served as senior vice-president and general manager of the microcomputer products group at Western Digital. At Emulex, Stephens replaced interim chief David Hanna, who will continue on the board of directors.

### OSF/1 to become a reality

The Open Software Foundation (OSF) said it will start taking orders tomorrow for the long-awaited OSF/1, its version of the Unix operating system intended to challenge AT&T's Unix System V as the industry standard. The expected rollout comes about 30 months after an 18-month delivery time frame cited by OSF when intentions to develop the operating system were announced in May 1988. Because OSF/1 is based on AT&T's Unix System V, OSF said it will take four to six weeks for customers to receive the source code because OSF must verify that they also have a license for Version 2.0 or higher of AT&T's Unix System V.

*More news shorts on page 115*

## D&B's medium is the migration

BY MARYFRAN JOHNSON  
and MAURA J. HARRINGTON  
CW STAFF

FRAMINGHAM, Mass. — Dun & Bradstreet Software began broadcasting a migration message last week to reassure its 11,000 users as they move toward a "future architecture" encompassing the applications inherited in the tumultuous merger of Management Science America, Inc. and McCormack & Dodge Corp.

"We are ready to flex our muscle a little bit," said James Henderson, executive vice-president of marketing and technology for the \$500 million software vendor.

Henderson said both product lines will be continuously and equally enhanced as D&B Software merges the lines onto a "next generation" suite of products in the mid-1990s.

"We will have a single product line in the future, but it will be up to customers when they migrate," he said. D&B Software plans to sprinkle financial sweeteners along that migration path by offering upgrades and conversion tools at no extra charge beyond a rise in maintenance fees.

#### Say the word

"It's still a lot of words at this point, but they're saying the right words," said Scott Davey, assistant controller of systems and planning for the accounting department at Fairchild Fasten-

er Group, an aerospace company based in Carson, Calif. "They're trying to keep us all happy," he said.

Other users contacted last week also seemed pleased with the company's intentions. "I think they've gone to great

hancements throughout the product line since the merger.

"D&B has a good reputation for treating acquired companies carefully and kindly," said Bernard Goldstein, a partner at Broadview Associates, a research firm in Fort Lee, N.J.

After six months of market research and extensive customer interviews, D&B Software officials came up with a two-pronged strategy.

In 1991, customers can expect major hits, or enhancements on all the financials, materials management packages, human resources, tools, manufacturing and higher education software, Henderson said.

The company will begin introducing what it calls "value-added products" — a kind of bridge to the unified product line — in relational database, workstation and midrange applications.

One example is a full line of products coming for the IBM Application System/400, which has only one D&B manufacturing application now.

By 1994, users should see a "re-architected" product line — built with computer-aided software engineering (CASE) tools — that will merge the two camps.

### Biggest little piece of pie

*Although it holds less than a quarter of the market, D&B Software (once MSA and M&D) is a major player in application software*

#### Percent of 1989 worldwide software revenues for U.S. independent vendors

<b>Accounting software (Total: \$1 billion)</b>	
MSA/McCormack & Dodge	23.3%
Computer Associates	10.8%
Oracle	9.6%
Ross Systems	2.8%
Other	62%
<b>Human resource management (Total: \$395 million)</b>	
MSA/McCormack & Dodge	16.2%
Integral Systems	8.4%
Cyborg	3.8%
Genesys	3%
Other	68.6%
<b>Manufacturing (Total: \$357 million)</b>	
Ask Computer Systems	9.6%
Pansophic	4.2%
American Software	3.6%
Computer Associates	3.6%
MSA	3.5%
Other	75.5%

Source: International Data Corp. CW Chart: Doreen St. John

lengths to keep their users secure," said Brian Cameron, administrative specialist at Stone & Webster, an engineering construction firm in Boston.

The MSA and M&D applications — renamed the "E Series" and "M Series," respectively — have had some 20 product en-

## Ingres merger plan puts Ask in proxy fight

BY JEAN S. BOZMAN  
CW STAFF

MOUNTAIN VIEW, Calif. — The merger of Ingres Corp. and Ask Computer Systems, Inc. turned into a race to the finish line last week as Ask attempted to jump all the legal and financial hurdles before Ask's shareholders meeting this Friday. The latest hurdle was tossed up by Ask's second-largest shareholder, who launched a proxy fight to displace Ask's current management.

At week's end, James T. Lennane in Naples, Fla., who owns 9.7% of Ask shares, had mailed out thousands of proxy letters to Ask shareholders. Lennane, who in 1973 founded System Integrators, Inc., a Sacramento, Calif., electronic publishing firm, now manages multiple investments, including a desktop publishing software firm.

The proxy statement said

that Lennane seeks election to the five-person Ask board of directors, along with two of his associates. Lennane's filing said his group "is diametrically opposed to the purchase of Ingres Corp., which it believes will dramatically weaken the financial position of Ask." The proxy fight could go on even after the merger is completed, Lennane's New York attorneys said last week.

An open letter by Ask Chief Executive Officer Sandra Kurtzig, written in response to Lennane's proxy letter, said, in part: "Your board of directors firmly believes that the proposed acquisition of Ingres . . . is in the best interests of stockholders and will enhance long-term stockholder values by positioning Ask to grow in the 1990s."

Last Thursday, Lennane's lawyers requested that a Delaware chancery court reconsider an earlier decision rejecting Lennane's request to bar Ask's sale

of \$60 million worth of stock to Electronic Data Systems Corp. and Hewlett-Packard Co. That stock sale, part of the complex arrangement to buy Ingres, would unfairly dilute the value of current shares, Lennane said. However, Lennane's latest motion was rejected on Friday.

Barring any legal injunctions, Ask was prepared to buy Ingres by Friday at midnight — the deadline for Ingres stockholders to tender their shares. "The only reason this deal wouldn't go through is if we didn't have enough shares tendered," an Ask spokeswoman said.

Ask planned an immediate layoff as soon as the merger becomes official but would not say how many Ingres workers would be terminated.

At week's end, EDS and HP were on standby. "Our commitment to be Ask's partner has not changed," an EDS spokesman said. "But this is really their fight. We're concerned about it, but it's up to Ask to deal with it." An HP spokeswoman said, "We have not signed a check yet, but we still have every intention of going through with our investment plans."



# Paperback pulls spreadsheet, won't appeal Lotus victory

BY PATRICIA KEEFE  
CW STAFF

CAMBRIDGE, Mass. — An unrepentant but beaten Paperback Software International agreed last week to stop marketing its VP Planner product line by Dec. 1 and pay Lotus Development Corp. \$500,000 for violating its 1-2-3 spreadsheet copyrights.

Paperback also agreed not to appeal a June federal court ruling that it had infringed on Lotus copyrights for the user interface portion of 1-2-3.

The initial outlook for VP Planner users is not good. Lotus said it has no plans either to support them or offer discounts as an incentive to move to 1-2-3.

A Paperback spokesman, Mike Burdick, said it will not "abandon" its VP Planner customers, which number at least 240,000, according to Dataquest, Inc. However, "We are not sure how we'll be able to support them. We have to look at what our options are," Burdick said, adding that it is possible that Paperback could come up with a noninfringing spreadsheet product.

Burdick termed the loss of the three-product VP Planner family, which contributed 68% of the company's revenue, "a significant blow." Two insurers are paying the damages to Lotus.

Although former chairman Adam Osborne has contended that win, lose or draw, the suit would destroy Paperback, Burdick was more upbeat: "We have mostly debt on our balance sheet, but we have enough stability to continue developing products, keep creditors satisfied

and market [four remaining] products. We have a chance to [be] a viable entity."

After four years of legal wrangling, the software publisher wants to pick up the pieces and move on. Paperback's primary focus will shift to VP Expert, an expert system development tool. Company President Stephen Cook said a further fight "is best carried on by participants with greater resources."

A similar case, involving another company with limited resources — Brighton,

Mass.-based Mosaic Software, Inc. — goes to trial this week. Mosaic has agreed to be bound by Judge Robert Keeton's rulings in the Paperback case concerning the scope of Lotus' copyrights and has also agreed that its Twin spreadsheet package copied 1-2-3.

Keeton faces at least two more Lotus copyright suits, which were filed in June against two better heeled rivals, Borland International and The Santa Cruz Operation. Borland's bid to have its suit tried in California failed; a trial date in Boston is expected to be set shortly.

Paperback's decision not to appeal spares Lotus the risk of having a federal appeals court reverse Keeton's ruling that 1-2-3's interface is copyrightable. "It gives Borland one less straw to cling to,"

Lotus attorney Hank Gutman said.

"The fact that a small company does not have the money to defend themselves any further does not change the merits of our case," said Borland spokesman Dick O'Donnell.

He claimed that in a case involving Ashton-Tate Corp.'s Full Impact software, the U.S. Court of Appeals for the 9th Circuit recently upheld an earlier ruling that the spreadsheet's menu structure is not copyrightable.

According to an Ashton-Tate spokesman, Borland has it all wrong. The California court only ruled that the spreadsheet metaphor, specifically the cells and "inverted L," were not copyrightable, he said: "The interface wasn't an issue in our case."



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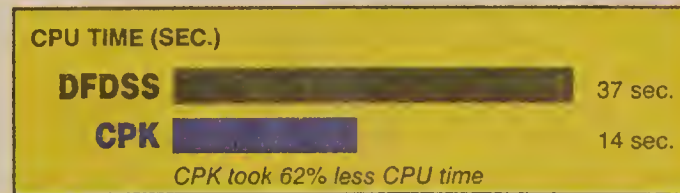
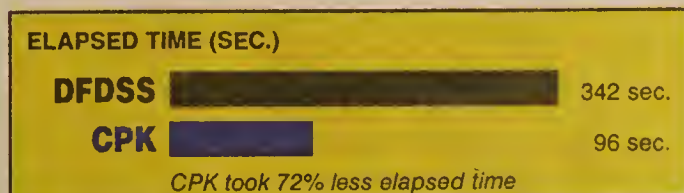
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## 3-2-1

After a slumping second quarter, Lotus Development Corp. took it on the chin, as expected, in its third quarter ended Sept. 30. While revenue grew slightly, about 2%, over the same period a year ago, net income plummeted 63%.

Wall Street and Lotus said they expect sales to rebound significantly in the fourth quarter, in part because of the release of 1-2-3 Version 3.1, which corrects some of the shortcomings in predecessor 1-2-3 Version 3.0.

Net sales for the third quarter totaled \$157.4 million vs. sales of \$153.9 million in 1989's corresponding quarter. Net income was \$8.6 million, down from \$23 million a year earlier.

In an effort to bolster its sagging stock, which has dropped as low as 12½ points from a 52-week high of 39¼, Lotus announced plans last week to buy back up to 12%, or 5 million shares, of its 43 million shares outstanding.

The news was slightly more upbeat at Ashton-Tate Corp., which reported a net income of \$1.1 million on net revenue of \$60.4 million in its third quarter ended Sept. 30.



# Unix box poised for small firms

*Application DEC 433MP seen as well-positioned market opportunity*

BY MARYFRAN JOHNSON  
CW STAFF

MAYNARD, Mass. — A Unix-based multiprocessor packed with Intel Corp. chips sashayed forth from Digital Equipment Corp. last week, with company officials eyeing a \$40 billion opportunity in computer sales to small to medium-size businesses.

The Application DEC 433MP is billed as the company's most expandable system, scalable from one to six Intel I486 processors and based on The Santa Cruz Operation's SCO Unix System V. It was designed to be sold through value-added resellers (VAR) and will be available in February at prices ranging from \$17,500 to \$80,000.

DEC officials said the machine poses no threat to its popular Microvax line, but industry analysts suggested that the system may hold more appeal for Fortune 500 Microvax customers than DEC realizes. "This may eat some low-end VAXs," said Wes Melling, an analyst at Gartner Group, Inc. in Stamford, Conn. "But we think DEC will pick up \$1 billion in net revenue that doesn't even touch their existing business in this market."

Companies looking for a Unix-based office automation server or preparing to make the transition from MS-DOS to Unix should find the 433MP particularly attractive as a low-priced server for networked personal

computers, Melling said.

Yet the present lack of Decnet support on the 433MP makes it an unlikely candidate to replace Microvaxes in some corporate networks.

Bechtel Corp., for example, has dozens of Microvaxes in its corporatewide DEC environment, said A. B. Cleveland, manager of automation technology at Bechtel's Gaithersburg, Md., regional office. "The more critical issue for us would be how well a machine supports Decnet," he said. "We are a global corporation with wide-area networks integrated tightly with LANs, and Decnet provides that for us."

## Pick from three

With the introduction of the 433MP, DEC is now offering its customers three versions of Unix — its own Ultrix operating system for technical computing, AT&T Unix System V for telecommunications and SCO Unix for small businesses.

"DEC sees this as a machine to sell to people who've never bought a medium-size computer before," said Robert Herwick, an analyst at Hambrecht & Quist, Inc. in San Francisco. "The tricky thing is they've been saying that Unix is not commercial, and here they are bringing out a commercial system for the Unix market. Will the real DEC please stand up?"

John Sitar, president of Corstar Business Computer Co., Inc.

in Hawthorne, N.Y., views the 433MP as "the beginning of a commitment to a whole new direction in computing by DEC."

As one of DEC's largest VARs for the past two decades, Corstar is a beta-test site for the new Intel-based machine and is now porting 1 million lines of code from VMS to SCO Unix.

The most significant point for users is being able to have low-cost asynchronous terminals accessing a central platform without networking, Sitar said.

DEC also beefed up its support and customer services for resellers, offering to subcontract DEC maintenance, recovery and desktop services for the smaller VARs as well as the larger ones.

The 433MP supports up to 128 users when fully configured with six processors and can operate simultaneously as a multiuser machine, a PC LAN server and an X Window System server. It will run thousands of applications based on the SCO Unix, MS-DOS, Pick and Mumps operating systems.

The system has a dual bus architecture that allows customers to attach additional peripherals — up to seven PC option boards — without slowing system performance, Eichhorn said.

Gartner Group figures the machine will compete handily against Compaq Computer Corp.'s Systempro, IBM's RISC System/6000 and NCR Corp.'s 3345.

and the way they support their transaction processing customers had to change," Kerns said.

Contel's major application is a "customer care system" that does everything from logging in orders from remote offices to tracking changes in the customer database. Because it was built on DEC's RDB database and several layered system software products, Kerns needed in-house

**D**EC IS always successful with its hardware. The shortcomings are on the software side."

PETER CORIASCO  
BANKERS TRUST

experts to keep his system up and running.

While VMS may share the same letters as MVS — IBM's mainframe operating system — the DEC system software is still not quite its equal, according to some users. At Bankers Trust Co. in New York, VMS' inability

to be partitioned or to run class scheduling has kept the bank at arm's length from the new mainframe.

"DEC is always successful with its hardware. The shortcomings are on the software side," said Peter Coriasco, vice-president for technological strategic planning at Bankers Trust. Partitioning would allow users to run multiple versions of the operating system, and class scheduling provides a way to "properly assign computing resources to individual applications," he explained.

## Taking it seriously

"I see the lack of these two as a major problem for users wanting to run multiple applications," Coriasco said. "But I know DEC is working hard on this, and I believe they will be successful. All the way from Ken Olsen down, they are taking software issues very seriously."

An unexpected use for the mainframe VAX turned up in Albany, Ind., at Paws, Inc., an art studio company founded by cartoonist Jim Davis, creator of Garfield the cat.

MIS director Tim Bird had a

# DEC rebounds mildly in first-quarter profit

BY RICHARD PASTORE  
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. followed up its first-ever money-losing quarter with a timid step on the road to recovery, analysts said last week. The second largest computer maker announced a small profit of \$26 million on sales of \$3.1 billion for the first quarter.

The news was a mild surprise for the more pessimistic DEC watchers, who predicted another loss or a break-even showing. "Things are not as bad as people

sluggish, the dip is due to DEC's product transition, according to Shao Wang, an analyst at Smith Barney, Harris Upham & Co. in New York.

However, observers noted that a number of products are doing well for DEC, including its Unix-based workstations and the mainframe-class VAX 9000, which, for the first time, contributed to the bottom line. Seventy-five VAX 9000 shipments added about \$100 million to the revenue coffers, Wu said.

DEC's service income grew a total of 8% this quarter, reach-

## Basic math

*Despite making cutbacks, DEC has watched climbing expenses and slowing sales combine to pinch profits*

digital	Q1 1990	Q1 1991
<b>Revenue</b>		
Product sales	\$1.99B	\$1.86B
Service and other	\$1.14B	\$1.23B
	<b>\$3.13B</b>	<b>\$3.09B</b>
<b>Expenses</b>		
Cost of sales	\$1.61B	\$1.66B
Research and engineering	\$404.1M	\$401.9M
Selling, general and administration	\$938.9M	\$1.02B
	<b>\$2.95B</b>	<b>\$3.08B</b>

Source: Digital Equipment Corp.

CW Chart: Paul Mock

feared; things have at least bottomed out temporarily," said David Wu, an analyst at S. G. Warburg & Co. in New York.

DEC lost \$256.7 million in the previous quarter ended June 30, the company's first taste of red ink. The dive prompted a plan to cut more than 5,000 employees from the payroll in this fiscal year.

Though the latest quarter's numbers seem to show DEC on the rebound, "it's a long road back," Wu said. "This is a company that's not healthy."

The main problem is that sales are down, observers noted. Product sales are off more than 6% from the like quarter last year. Though the economy is

ing \$1.23 billion. The portion of that income derived from systems integration services is growing by 20%, according to Wu.

Though it is difficult to extrapolate from one positive quarter, analysts predicted that DEC will continue its long, slow recovery next quarter with higher revenue.

But analysts warned that DEC's fourth-quarter numbers will probably not compare favorably with last year's like quarter, which was fairly strong. This quarter's earnings suffered in comparison to the previous year as well — revenue was down about 1% while profit fell off by nearly 83%.

VAX 9000 Model 210 installed in August to provide Paws with a giant file server, a general purpose accounting and database machine and a production design system. The DEC service team particularly impressed Bird one night by flying in four KDM-70 disk controllers to replace defective ones that arrived with the machine.

"An hour after the first private jet brought us those KDM boards from Chicago, DEC sent another set of spares in case they didn't work," Bird recalled.

One user who falls into the classic technical mold for use of the mainframe VAX is Chrysler

Motors Corp. in Detroit, where the advanced manufacturing technical center has just installed one VAX 9000 Model 210 and has another on its way at Christmastime.

According to Joe Bulat, manager of computer-integrated manufacturing, the mainframe has quadrupled the power of his present Vaxcluster and provided some 1,200 users with the necessary support for product engineering. One key new application made possible with the VAX 9000 is handling the high-speed flow of real-time information between 10 assembly plants and three stamping plants.

## VAX

FROM PAGE 1

The VAX 9000 order backlog is reportedly as high as 400 systems already, and the company reportedly plans to ship at least 100 mainframes every quarter. One year ago, however, DEC officials were hoping to have approximately 300 to 400 mainframes out in customer sites by the end of 1990.

"We're still managing the ramp-up to full production," said Bob Glorioso, vice-president of DEC's information systems business unit. "We are paying attention to what the customers tell us, and they're teaching us."

What George Kerns had to teach them, for example, convinced DEC to station three of its full-time employees at Atlanta-based Contel Cellular, Inc. Kerns, who is vice-president of information services at the cellular phone company, rejected the notion of calling the DEC hot line in Colorado Springs to muddle through a system software diagnosis.

"We're all doing some pioneering with their technology,



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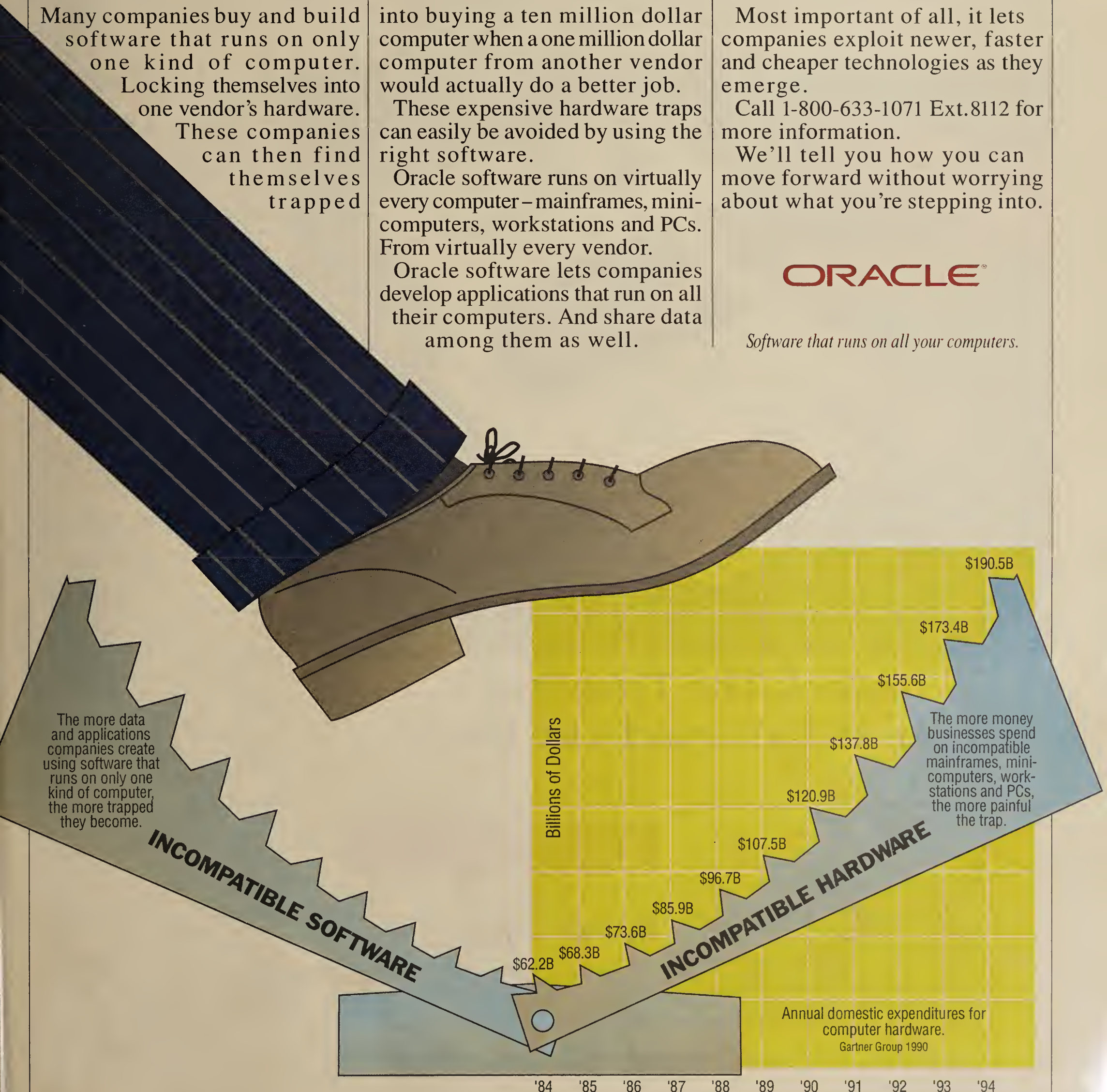
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# DG goes with leaner, meaner MV product line

BY SALLY CUSACK  
CW STAFF

WESTBORO, Mass. — Data General Corp. has reconfigured its bread-and-butter line of proprietary midrange systems with the announcement of the MV/30000.

"The MV line provides us with over a billion dollars in product and service revenues," said Dave Ellenberger, recently appointed division vice-president at DG's Eclipse marketing unit. "This is the fourth new MV platform we have announced this year."

The MV/30000, scheduled to take its

official bow at the annual DG user group meeting in Seattle this week, replaces the vendor's MV/15000 and MV/20000 systems. It is targeted at midrange customers doing office automation and business applications.

## Cleaner product

According to Carolyn Griffin, an analyst at International Data Corp., a market research firm based in Framingham, Mass., the positioning creates a "cleaner and more streamlined MV product line." Griffin also said she feels that DG's newly consolidated MV product development and marketing divisions will make MV opera-

tions more efficient, from both a customer and a vendor standpoint.

The MV/30000, which runs the AOS/VS II operating system, is available in single- through quad-processor configurations and can be expanded with up to three I/O channels. The processor is based on a single-chip, custom CMOS microprocessor designed by DG and manufactured by Hitachi Data Systems Corp. in Japan.

Single-chip technology, which creates a single-board computer, offers the customer savings in terms of cost and reliability, Ellenberger said. He added that CMOS architecture allows customers to

take advantage of developmental advances in the semiconductor world.

One DG MV/15000 user, who wished to remain anonymous, commented that he had little interest in new MV system announcements and was more eager to take advantage of a "definitive" open systems migration plan coming out of the company.

The MV/30000 reportedly supports as many as 2,472 direct asynchronous connections and offers up to 256M bytes of error checking and correcting memory, which is available in 16M-, 32M- and 64M-byte increments. Other features include a diagnostic processor and a rack-mount chassis. Pricing for a single-processor, 16M-byte platform configuration is \$120,000.



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## Oracle CEO owns up to feet of clay

BY JEAN S. BOZMAN  
CW STAFF

BURLINGAME, Calif. — Oracle Systems Corp. executives said they are not blaming anyone but themselves for Oracle's recent financial woes. At last week's shareholders' meeting here, Chief Executive Officer Larry Ellison took personal blame for the firm's recent \$36 million loss [CW, Oct. 1] and conceded that Oracle executives had been out of touch with middle managers.

"I wish I had seen it coming and changed our [high-growth] strategy earlier," Ellison told several hundred investors who gathered at Oracle's annual meeting Oct. 15. "If I had seen it six to nine months earlier, the first-quarter disaster need never have happened. But I didn't see it coming, and that responsibility is mine."

Senior management placed too much emphasis on expanding sales at yearly rates of 50% or more and had neglected to fix the bugs in existing software, Ellison said. "Development team managers recently told us, 'It's about time you guys in management finally figured out that we need to take time to fix the bugs,'" he said. "They also told us, 'It's about 18 months too late.'" Ellison said Oracle's new plans call for selling most Oracle products into the firm's existing customer base.

Ellison's remarks at the stockholders' meeting came minutes after a pro-forma renomination of the current board of directors.

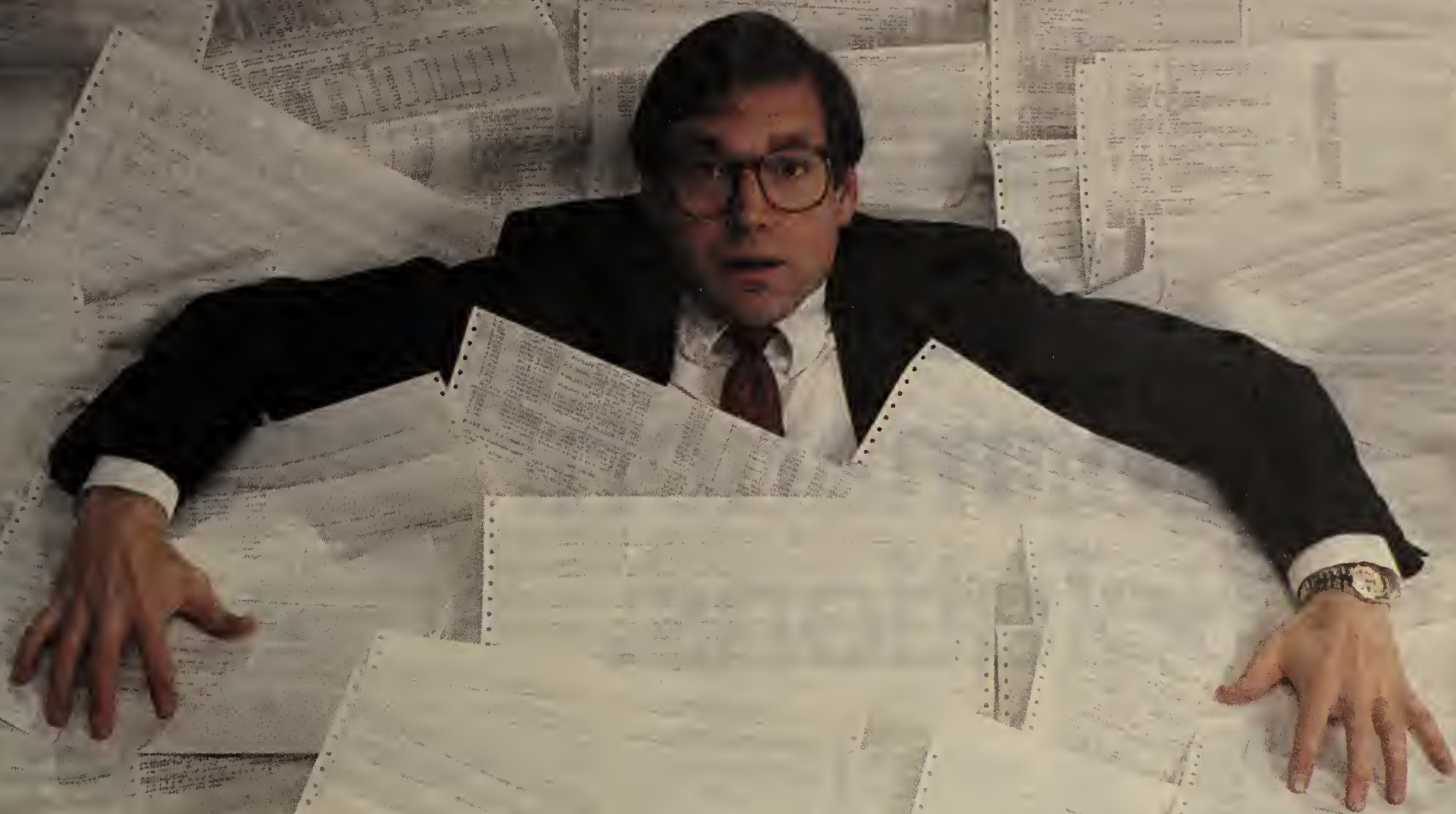
## Board scout

Ellison said he and Chairman Donald Lucas were spending much of their time scouting for new board members and other senior managers from multibillion-dollar high-tech firms. "We will take all the help we can get, from all quarters," Ellison said. "Nobody on the [current] board has run a multibillion-dollar corporation."

Industry analysts seemed relieved that top management was going on record for failing to forecast Oracle's 1990 sales slump in the face of a slowing world economy. "Oracle management needed to get rid of industry criticism that ... they weren't taking responsibility for what happened," said Charles Phillips, a senior analyst at Soundview Financial Group, Inc. in Stamford, Conn.



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# AT&T to give Centrex users long-distance ISDN ability

BY ELLIS BOOKER  
CW STAFF

BASKING RIDGE, N.J. — AT&T said last week that it will be able to offer ISDN Centrex customers connectivity over its long-distance network, crediting a software upgrade for the central office switches its Network Systems unit sells to local telephone companies.

While limited for now to Centrex services based on AT&T's 5ESS central of-

fice switch, analysts said the new service is significant in that it points the way toward flexible, nationwide Integrated Services Digital Network (ISDN).

"It extends the benefits of ISDN and allows, although with limitations, end-to-end service to Centrex customers," said Steve Sazegari, a senior industry analyst at Dataquest, Inc. in San Jose, Calif.

Up until now, Centrex-based ISDN arrangements have existed as islands, although they have been connected, for

demonstration purposes, over private-line networks.

The Primary Rate Interface Nodal/Centrex Express (PRINCE) service will permit ISDN Centrex customers in two locations to establish a Basic Rate Interface ISDN call over AT&T's Primary Rate Interface (PRI), the ISDN service it launched in 1988.

PRINCE will only work for users whose Centrex ISDN service is provided through an AT&T 5ESS central office switch that has been loaded with the 5E6 generic software release that AT&T Network Systems began deploying at local telephone exchanges last year.

A limitation of the service, AT&T said, is that a PRI can only support a single customer connection. AT&T's PRI service

has a \$3,000 one-time installation fee as well as a \$400 per month fee.

Meanwhile, the second largest central office switch vendor, Northern Telecom, Inc., said last week that its local switch, the DMS-100, supports ISDN protocol connectivity with both the AT&T 4ESS and Northern Telecom's own DMS-250 toll switch. AT&T, which said Prince would be available at 250 local exchange central offices by year's end, had no comment on whether PRINCE would work with the Northern Telecom systems.

## Apple financials hit slow track

BY JAMES DALY  
CW STAFF

CUPERTINO, Calif. — Apple Computer, Inc. felt the crunch from the slowdown in the personal computer industry last week when it announced financial results in which yearly sales figures had inched up slightly while quarterly earnings took a nosedive.

Net revenue for the fiscal year ended Sept. 30 totaled \$5.56 billion, a 5% increase over the \$5.28 billion reported for 1989. Net income for the full year was \$474.9 million, or \$3.77 per share, up 5% from profits of \$454 million, or \$3.53 per share, last year.

Revenue for the fourth quarter was \$1.35 billion, down 2% from the \$1.38 billion reported for the corresponding period in 1989. Profits for the quarter were \$98.5 million, or 81 cents per share, down 39% from the \$161.1 million, or \$1.24 per share, reported last year. Earnings from one year ago also included \$48 million from the sale of Adobe Systems, Inc. common stock.

Chairman John Sculley partially attributed the mixed results to the readjustment of the Macintosh product line, in which anticipation of new low-end Macintoshes stifled sales throughout the line. "We expect that many customers who wanted our products but didn't purchase them because of their prices will now choose Macintosh," he said.

Last week, the firm introduced a trio of new Macintoshes — including one priced at less than \$1,000 — that reduced the entry price to Macintosh by as much as 50% and is expected to make Apple machines more competitive with similarly configured MS-DOS machines.

Analysts said they expect the additions will help Apple regroup. "Apple is poised to increase its share of the personal computer market over the next two years," said David Wu, an analyst at S.G. Warburg Securities in New York.

The company, however, still faces tough competition from Microsoft Corp., which in the spring introduced the Windows 3.0 graphical user interface package that closely approximates the point-and-click screen appearance of the Macintosh.

While the domestic market is softening, Apple officials said they will continue to look overseas to take up the slack. The international market, particularly Europe, continues to play an increasingly important role in the firm's financial portfolio. International sales accounted for 42% of net sales for the full year, compared with only 36% one year ago, company officials said.

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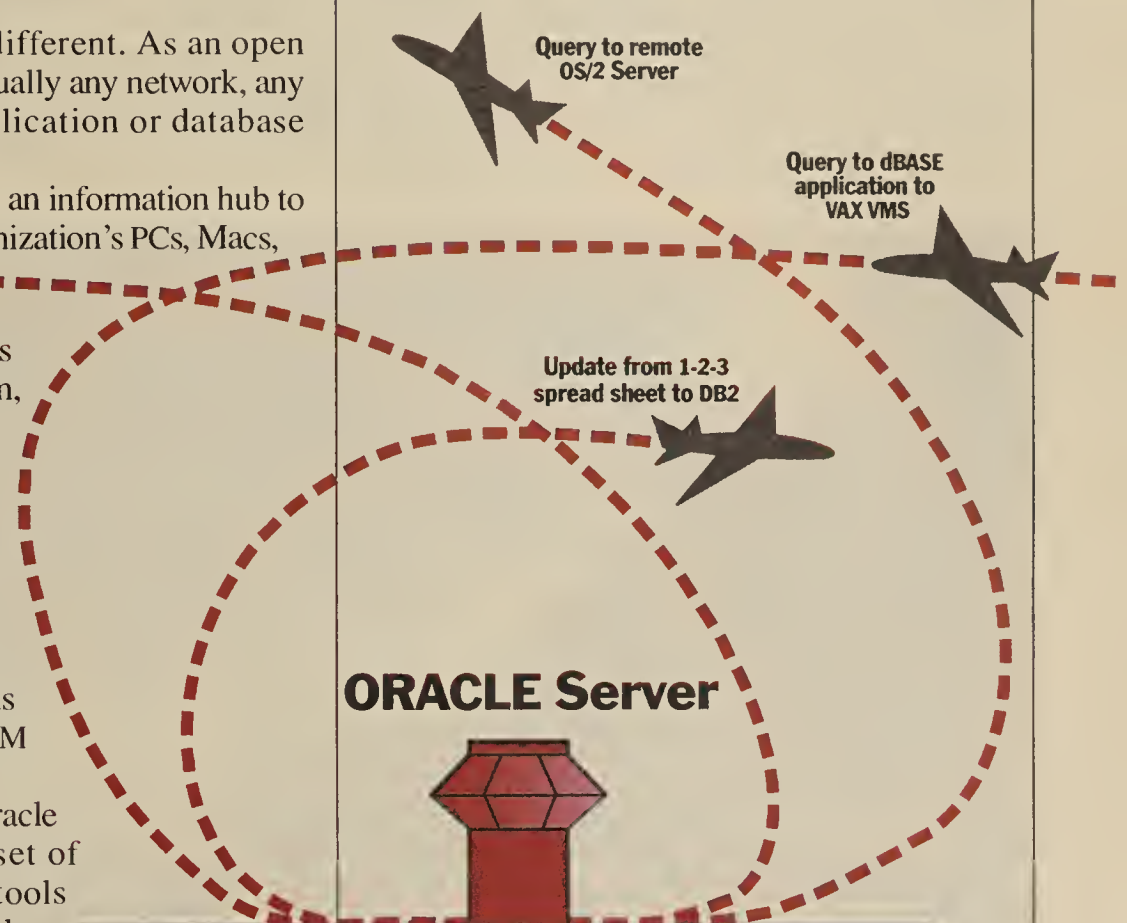
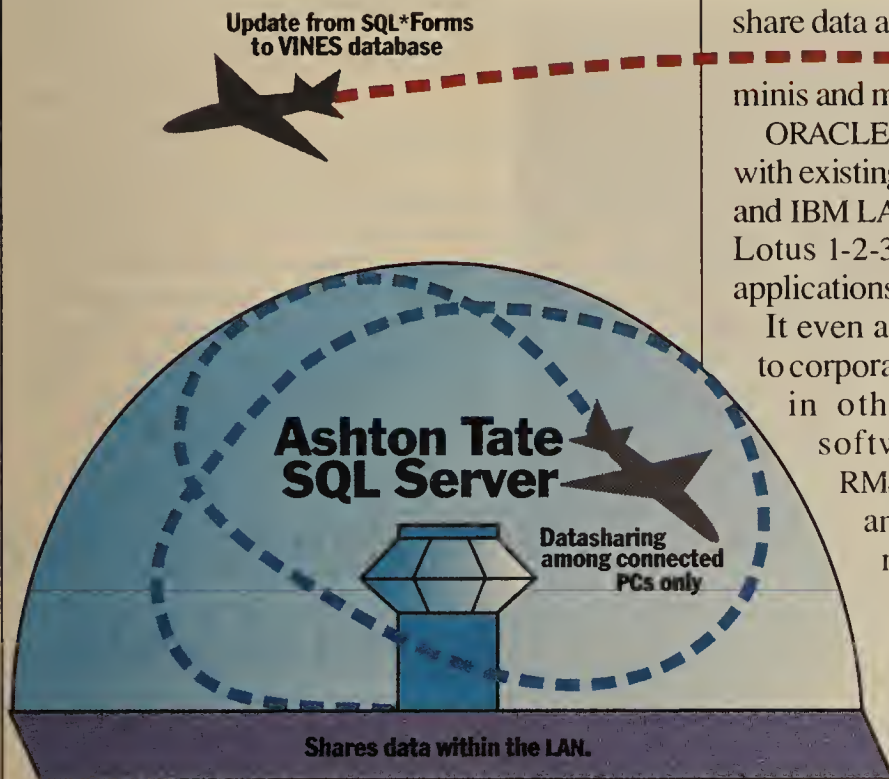
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# Wang introduces open standards software plan

BY SALLY CUSACK  
CW STAFF

BOSTON — Wang Laboratories, Inc. moved last week to make good on its December 1989 promise of open standards by introducing a software connectivity plan that allows Wang VS minicomputers to work as servers on personal computer-oriented local-area networks.

Introduced at the U.S. Society of Wang Users' (USSWU) annual meeting in Boston, Open/Server also includes enhanced communications with other minicomputer and mainframe hosts.

The Open/Server architecture has

been divided into two groups of products.

Level One products allow PC users on industry-standard LANs, including those from Banyan Systems, Inc., Novell, Inc. and 3Com Corp., to access Wang Integrated Image Systems and Wang Office applications on the VS computer. Level Two products enable the user to construct enterprisewide networks that support strategic applications via the client/server model, the company said.

"This means users can have a very standard imaging system on a LAN and also maintain their VS for other applications," said Scott McCready, an analyst at Framingham, Mass.-based International

Data Corp.

Peter Forbes Pollack, managing director of MIS at Financial Security Assurance, Inc. (FSA) in New York, said Open/Server capabilities are "crucial to our environment." FSA has been beta-testing Open/Server products since June.

FSA has four Banyan Virtual Networking Software (Vines) LAN installations scattered across the globe and anticipates providing end users with access to office automation, electronic mail and client-tracking system applications currently residing on a VS 10000 computer.

"We want to hook everyone into the mini in a transparent client/server envi-

ronment," Pollack said, adding that the Open/Server products allow the host system to participate as a peer in server-to-server communications.

Other users are adopting a wait-and-see attitude. Tony Bishop, a manager at Ford of Europe, based in Essex, England, said the product line may protect Ford's heavy investment in Wang systems: "We're hoping that Open/Server will help us reposition ourselves from a mini host to a LAN server environment." Ford of Europe currently has more than 270 Wang VS midrange computer installations and is piloting an imaging application for its customer service program.

Wang also announced OEM and joint development agreements with third parties to support Open/Server, including an agreement with Novell for Wang to resell, service and support Novell's Netware product line; an OEM agreement with Proteon, Inc. that allows Wang to market Proteon's Pronet 4/16 token-ring twisted-pair networking products; and an agreement with Oracle Systems Corp. for a new version of Oracle for Wang VS, a relational database management system.

"Last year, everyone was starved for information on both the company and the products," said Matthew Gillman, president of USSWU. "This year the atmosphere is calm and professional."

## Borland one-two aimed at Lotus

BY JAMES DALY  
CW STAFF

SCOTTS VALLEY, Calif. — Borland International delivered its latest salvo against struggling Lotus Development Corp. last week when it began shipping a more powerful version of its Quattro Pro spreadsheet program.

The introduction of Quattro Pro 2.0 continues Borland's intensive campaign to unseat Lotus' 1-2-3 as the longtime king of the hill in the spreadsheet world.

Borland also delivered a follow-up punch with the announcement of an aggressive enticement plan allowing users of competitive spreadsheet packages to swap over to Quattro Pro 2.0 for \$99.95.

Borland's previous offensive appears to be making strong headway against Cambridge, Mass.-based Lotus, which last week released third-quarter earnings that were down sharply from last year [see story page 7]. Since early 1989, Borland's share of the spreadsheet market has leaped from 5% to approximately 25%, according to Dataquest, Inc.

Many of the half-million Quattro Pro units sold since its introduction this year appeared to have been bought by disgruntled Lotus users. A study conducted by Vista Marketing Research in Oakland, Calif., indicated that more than 80% of Quattro Pro users previously worked with 1-2-3 for their spreadsheet needs.

Some new Quattro Pro users said they switched from 1-2-3 because Lotus has become difficult to deal with. "We've become very disappointed with Lotus," said Carl Hane, head of microcomputer application systems at MCI International, Inc. in Rye Brook, N.Y. "Their support structure is very bad, and they don't seem to be willing to listen to their customers when it comes to product enhancements."

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# ADVANCED TECHNOLOGY

## TECH TALK

### LCD patent in focus

■ In Focus Systems, Inc. said last week that it was awarded a patent for a high-resolution — 1,280 by 1,024 pixels or greater — monochrome LCD. Prior attempts of LCD makers to design high-resolution LCDs were hindered by inadequate refresh rates. In Focus Systems solved the problem by stacking two 1,280- by 512-LCD panels, using a process called interdigitating. Each panel contains alternating rows of active and inactive pixels that are staggered so that each active row aligns with an inactive row. Interdigitating the panels reduces the number of rows that must be refreshed by a single panel, making it possible to achieve the 60 times per second refresh rate that is needed for high-resolution display.

### Star Wars medicine

■ Radiologists at Johns Hopkins Hospital claimed recently that a three-dimensional computer system adapted from movie animation technology has been used on nearly 3,000 patients in the past four years to improve treatment and spare many the pain and cost of surgery. A 3-D imager, developed by Elliot Fishman, associate professor of radiology at Johns Hopkins, and computer scientist Derek Ney, is based on Pixar computer technology that was used to create life-like animation sequences for such films as *Star Trek II*.

### Complex concerns

■ In a survey commissioned by the Association for Computing Machinery, top scientists expressed doubts about the safety and reliability of complex computer systems. As such systems take charge of everything from phone calls to airplane flights, the scientists warned of an increasing danger of man-made disasters. The scientists also expressed fear that the misuse of computer models could lead the government to adopt disastrous policies in dealing with such topics as global warming and economic growth.

## Chief publishing officer to the rescue

*Drowning in a sea of paper, corporate America needs someone to take control*

BY MICHAEL ALEXANDER  
CW STAFF

**D**espite dreamy predictions to the contrary, corporate America has yet to move into the paperless office. Computer technology now makes it possible for anyone to design and produce reports, forms, white papers and umpteen other documents, sometimes with only a few simple keystrokes. As a result, business is drowning in a sea of paper and shouting for a lifeguard, someone who will take control of corporate publishing and stem the paper flow, according to some analysts.

That lifeguard, with the title of chief publishing officer, may soon move into the office next door to the chief information officer in most large corporations and conceivably even be one rung up on the management ladder, one analyst said.

Stemming the paper flow has become a priority at most large corporations because the costs of creating, printing and storing documents have gotten out of hand, said David Henry Goodstein, a printing industry analyst and president of Interconsult, Inc. in Arlington, Mass.: "The economics are staggering." The corporate paper pile is growing at 4% to 6% per year, and the information on half of those documents is obsolete soon after it is printed, he said.

### Mystery chief

Just who will likely be the chief publishing officer remains a toss-up, but it will probably be between IS and in-plant print shop managers. Right now, the odds favor in-plant print shop managers, Goodstein surmised. Only a small percentage of corporate information — primarily financial data — is automated and under the control of the IS manager. The overwhelming bulk of information remains on paper documents consisting of text and images, and that is the domain of the print shop manager, he said.

IS and print shop managers are each at opposite ends of the corporate document creation and publishing stream; what happens in the middle ground, where desktop computer systems will be linked with high-volume electronic printing presses, will determine who will get the nod to take over as chief publishing officer, said Ben Lusby, director of administrative services at Blue Cross and Blue Shield of the National Capitol Area. Lusby oversees desktop publishing and in-plant printing for Blue Cross. "It will depend on whether IBM or Xerox wins," he said.

IBM and Xerox, as well as other

companies, are approaching the paper problem from different ends of the spectrum, Lusby said. IBM and others are touting computer systems tied to increasingly powerful laser printers, while Xerox is touting high-volume, electronic printing presses with computer and other digital capabilities.

"I would say if there is a printer from IBM that solves the publishing



Xerox's Docutech electronic printing press

need, you're going to see a [decentralized] data processing solution; if it is Xerox, it will be a centralized publishing solution," Lusby said.

Earlier this month, Xerox introduced an electronic printing press called the Docutech Production Publisher, which the company said bridges the gap between computer workstations and business publishing by combining advanced technologies in scanning, filing, printing, finishing and networking [CW, Oct. 8].

The two-ton electronic publishing system, which costs \$220,000, is capable of producing 135 laser-printed pages a minute at 600 dot/inch. The electronic press forces home the argument that IS and in-plant printing managers are closing in on common ground.

Already, Xerox is planning to make networking software available early next year that will link the Docutech to local-area networks running Novell, Inc.'s Netware. Xerox has also inked pacts with AT&T, Adobe Systems, Inc., Digital Equipment Corp. and Sun Microsystems, Inc., among other computer companies.

### Common occupation

Lusby agreed with the notion that a chief publishing officer may one day be a common occupation in large corporations; he and his counterpart in IS already report to the same vice-president at Blue Cross, one indication that the two responsibilities are seen as being compatible, he said. However, "it is not likely" that the chief publishing officer would oversee both IS and publishing. "I can't imagine being that smart in both areas," he said.

Other analysts are skeptical that a chief publishing officer will arise from

the middle ground between desktop and electronic printing systems. Ultimately, the task of overseeing corporate publishing will be taken over by a chief information officer because computing and publishing are no longer separate processes but one and the same, said William Clinton, who follows the electronic printing industry as the director of compound document services at BIS CAP International, Inc. in Norwell, Mass.

"The chief information officer is going to be responsible for a corporation's information and systems, but it is still going to need to have expertise in producing the final document and publishing it," Clinton said. "I don't see one replacing the other."

There are several levels of publishing in virtually every part of the organization, and each requires a different amount of end-user education and skill, Clinton said: "They will still need this guy [the

print shop manager] controlling information going out of the organization because it will always be important to have consistency."

What the melding of these two systems portends is a new way of assembling and distributing information, which in turn will lead to new responsibilities for both the IS and in-plant print shop manager, he said. "Managers can no longer think of publishing in tradi-

**O**NLY A SMALL percentage of corporate information — primarily financial data — is automated and under the control of the IS manager. The overwhelming bulk of information remains on paper documents consisting of text and images.

tional terms," Clinton said.

The future will be in "compound documents," in which the technologies of computer processing and publishing intertwine. This compound document will probably consist of text, images and multimedia effects. As an example, the insurance claims adjuster who now looks at static, two-dimensional images of an automobile will be handed "documents" that include full-motion video and other effects that will allow the adjuster to look at all facets of an auto, including the inside and undercarriage, Clinton said.



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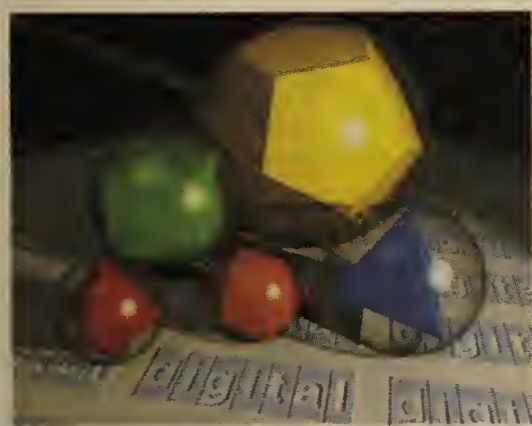
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## EDITORIAL

## Get comfortable

**B**USINESSES BOTH BIG and small in San Francisco are nervous, and they have good reason to be.

Pending legislation seeking to protect VDT workers would saddle user companies with what they consider excessive and unwarranted costs. Bank of America estimated it would have to shell out some \$44 million to bring its 6,000 VDT workers into compliance with the proposed rules.

Proponents of the legislation counter by saying that those costs are a small fraction of the estimated medical expenses of treating injured VDT workers. This is an interesting counter, given that the number of workers who have suffered gross injuries directly attributable to VDT use at any site — well, suffice to say you could probably count them on one hand without affecting your typing speed.

Nonetheless, the legislation is not without merit and, in fact, contains some very compelling messages for all organizations that have workers who use VDTs.

Unlike the many unfounded outcries in the past that attempted to link VDT use to serious health side effects because of radiation emissions, virtually all the requirements of the San Francisco legislation deal with basic worker ergonomics: mandatory use of nonglare screens, adjustable chairs and tables, proper spacing of workers (although at five feet of space between each worker, the proposed requirement is perhaps a bit ambitious in this regard).

It is encouraging to see that the blind pursuit of — if not insistence on — proof linking VDT emissions with all sorts of maladies has petered out. There is absolutely no scientific evidence proving that electromagnetic radiation from VDTs is a health risk to operators.

Moving away from the emissions hysteria has allowed researchers to concentrate on the real culprits behind VDT worker discomfort — namely, the workplace environment.

Simply put, the workplace never really adapted properly to the introduction of VDTs, 90% of which occurred in the last decade. Office workers used to handle paper comfortably on a horizontal desk exactly 2½ feet from the floor.

Today, they read this information on blinking colored, curved screens that glare mercilessly in their faces. The workers don't move much. The workplace was never re-engineered to accommodate these basic changes.

Also, there hasn't been much hue and cry about the plight of office workers because of invalid assumptions that office work isn't dangerous because it isn't "heavy" work. Now that's changing.

So there are really two messages coming over the wires from San Francisco. The first is an affirmation of ergonomic requirements. The second is more vital to heed: Business either needs to get busy and start policing these matters on its own or risk having to accede to the demands of politicians. Which would you prefer?



## LETTERS TO THE EDITOR

## Intelligent design

Computers have found widespread acceptance in analysis and rendering applications in design. The common thread among these applications is the model. In mechanical design, the designer assimilates knowledge about the task (functional specifications) and the world (experience) and produces a model (the conceptual design) that is successively refined and improved until it satisfies all the requirements of the functional specifications and the global constraints imposed by the world (detailed design).

While tremendous contributions have been made using computers to help designers optimize detailed, concrete models, their usefulness in aiding designers in creating models has been limited, particularly in the area of mechanical design. This is because model creation requires the ability to reason abstractly — something uniquely human — and because computers have been traditionally used to manipulate details rather than ideas.

We should begin to explore the requirements of knowledge representation for conceptual design with the ultimate goal of bringing the synergistic power of man and machine together as early as possible in the design process.

Adam Starchild  
Ashland, Ky.

## Objection

Regarding the In Depth article on object-oriented programming [CW, Sept. 17], it should be understood that there is a difference between object-oriented programming and database de-

sign. The impact of database structure on how a system is programmed is important, but it is only a side issue; discussing how object-oriented technology will "compete with" relational technology is missing the point.

Object orientation does not have its origins in the programming language C++: It goes all the way back to Simula67, which is the first language to support the "class" language construct.

I understand that it is good to give a simple and meaningful description, but at what expense? Do we want misinformed IS professionals out there thinking object-oriented programming is just for writing database-oriented systems and that it must be done under Unix?

I urgently request that you publish a follow-up article that is truly "in depth" and accurate. Articles such as this one contribute to the smoke surrounding object orientation.

Philip W. Hall  
Software Engineer  
Advanced Manufacturing  
Systems Division  
Cincinnati Milacron  
Cincinnati, Ohio

## Personal problems

I was intrigued by the article by Dennis Noonan on the Viewpoint page [CW, Sept. 10]. As I was reading it, I couldn't make up my mind if he was being serious or very sarcastic.

With the advent of personal computing, many saw the opportunity to wrest control away from those who communicated in dataspeak and put it in the hands of the users. To do this, they did exactly what Mr. Noonan describes: They handed over thousands of dollars worth

of hardware and software to managers and clericals and, in essence, said, "Have a ball. Control your own destiny."

What resulted was a world of individuals who were already doing an eight-hour job in an eight-hour day and on top of that were expected to learn, pretty much on their own, something totally and absolutely foreign: DOS, Reboot, EDLIN, DEVICE=ANSI.SYS. Give me a break!

What these people want is exactly what they deserve: applications developed by we in management information systems who (supposedly) know what we're doing; applications which do the exact job needed to be done; applications which "come up" either when the machine is turned on or by pressing one function key; applications with Lots-O-Help that are forgiving, well documented and reliable.

Who are we kidding? PCs are never going to make the applications backlog go away. If anything, they're making them longer. We in MIS are writing the same kinds of applications we've written for years. We're just writing them for a different platform, with different tools and in much less time.

Eric S. Helland  
Project Manager  
Corporate Financial Systems  
Woolworth Corp.  
Milwaukee, Wis.

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor In Chief, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701. Fax number: (508) 875-8931; MCI Mail: COMPUTERWORLD. Please include a phone number for verification.



# Get ready for staffing squeeze

DUWAYNE PETERSON



Many of the older systems developed during the IS boom in the '70s and '80s have become obsolete

and require heavy maintenance to keep up with business needs. Companies find themselves dependent on employees who have been around since the systems originated. These people may be the only ones who completely understand such systems, and this scenario is more common than most companies would be willing to admit.

The fear of losing these employees almost forces us to consider providing bodyguards and limousines to ensure they make it to work.

Maintaining a supply of qualified personnel is a challenge that IS organizations are going to find increasingly difficult in the 1990s. Addressing this challenge in today's economic environment is especially difficult when many companies have had to downsize their work forces to reduce operating expenses.

As we move forward in this decade, the supply of qualified IS people will be decreasing as the demand for their skills increases. Factors such as the need to re-

engineer older systems, the emergence of new technologies and increases in the technical savvy of business users will foster this demand. Additionally, competition for IS people will strengthen as systems integrators and outsourcing firms enter the marketplace.

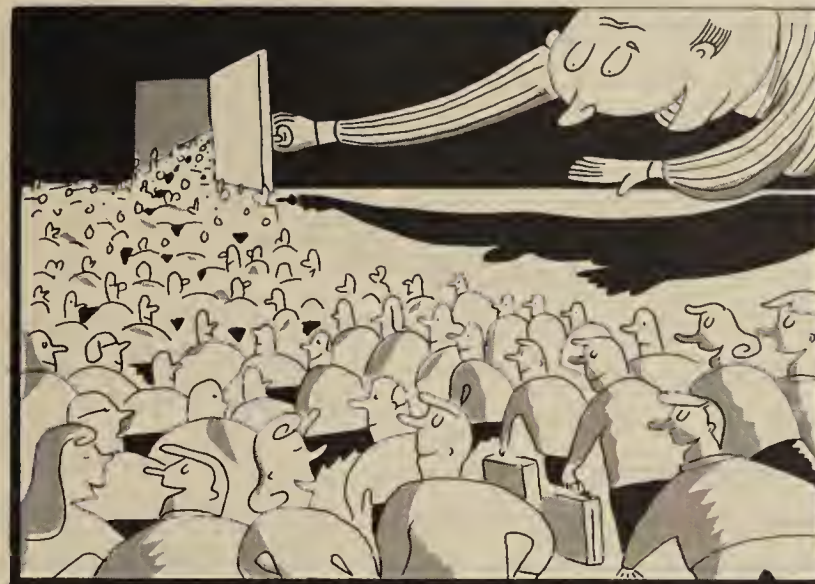
Now is the time to develop strategies to enable our companies to meet the future IS resource needs. The firms that achieve an advantage in the 1990s will be those in which a partnership is formed between management and employees.

The key to forming such a partnership is communications. Each individual in a company has dual roles of customer and supplier. Managing the dynamics of this dual role involves the identification of customer requirements and ensuring that the right things are done to satisfy them. Basic employee requirements include the following:

- The desire to work for a company that is respected both internally and externally.
- Open communication with management.
- Challenging goals that are aligned with organization and customer/supplier goals.
- Responsibilities and the power to carry them out.
- Recognition for a job well done and resulting job security.

The best place to look for resources to meet future IS skill demand is in your own organizations. Employee surveys will tell

you what the requirements of employees are, how they prioritize them and how good a job your company is doing at meeting them. Salary benchmarking is also important to ensure that your company is compensating



M.E. Cohen

on a competitive basis.

Aligning IS strategies with business strategies can help determine future skill needs. As new technologies are introduced, many IS people will need to be retrained. During the next decade, the roles of programmers and systems analysts will change to that of a business analyst. In addition to technical training, these people will also need training on the business operations and functions.

The structure of organizations is also changing from the

hierarchical management by function to a flatter organization aligned to technologies and products.

Management development programs are also needed to prepare future managers and enhance the skills of current ones. Policies that provide for job rotation and cross-functional training will facilitate individual

vance women and minorities.

As these changes come about, a greater effort must also be made in the area of work/family policies. Flexibility in work schedules is needed for mothers and fathers to raise families and also to provide care for aging parents. With the technology available today, it is possible for many people to do some work from home, work flexible hours or even share positions.

Many of the things that need to be done to keep qualified IS employees are the same as for any other employee. The difference is in the greater need for training in both technical and business areas.

In many cases, IS people are bright and creative and often introverted. These individuals thrive on opportunities to experiment with the latest technologies and should be given opportunities to discover new solutions that can help companies support new business opportunities.

Some people will say this is all well and good, but budgetary pressures will not allow these types of programs to be pursued. To these people, I say good-bye, because their organizations are doomed to extinction or second-class status. It's time for executives to lead and provide a workplace where people can operate with dignity and professionalism. The smaller work force of the coming "Baby Bust" generation will put a greater emphasis on human resources, and the way that resource is managed will make the difference in the marketplace.

## Gary Biddle: A thinking man's IS chief, a friend

CLINTON WILDER



During the unhappy task of doing interviews for last week's *Computerworld* story about Gary Bid-

dle's death, I found a familiar refrain among those who knew him. Whether the person was a fellow IS executive, consultant or vendor, I consistently heard, "But you know, we had more than a business relationship. I regarded him as a personal friend."

The late vice-president of IS at American Standard had that kind of effect on people; he certainly did on me. He was not a gregarious, backslapper type, but he was genuinely warm and keenly interested in other people's ideas. And he was very happy to share many of his own.

Wilder is *Computerworld's* senior editor, management.

After I became *Computerworld's* senior editor of management in early 1989, Biddle was the first IS executive who I profiled. Our 90-minute interview in his quiet Manhattan office was one of those sessions that a journalist lives for — when the interview breaks the boundaries of question-and-answer to become a truly engaging conversation, a sharing of intellect.

When I pulled out that profile for background information to write his obituary 10 days ago, I saw that I had written, "Gary Biddle is one of the deep thinkers of the IS profession."

As we all know, however, there are plenty of IS visionaries out there now working for new companies or consulting firms because they lacked the political skills to implement the vision. Not Biddle. Eastman Kodak IS executive Henry Pfendt paid him perhaps the highest compliment possible to bestow: "He practiced what he preached."

Biddle's intellect was impressive, but what made him *effective* was his ability to talk air brakes and air conditioners. He knew American Standard's business inside and out; he had worked there since age 18 and spent his early career in manufacturing. So when he talked about coordinating information technology with business strategy, senior management listened.

It was a two-way street; because Biddle knew he had that credibility, he didn't have to worry about guarding his data center empire. That led to American Standard becoming the first major proponent of outsourcing, 1990s-style. Biddle didn't farm out the whole ball of wax but instead identified CPU cycle time as a commodity that could be run on a Genix mainframe in Pittsburgh as easily as an American Standard mainframe in New Jersey.

Once American Standard's outsourcing became publicized, Biddle received hundreds of phone calls — many from CEOs who wanted to know more. And for many of them, Biddle obliged. He openly shared what his company had done. Biddle viewed outsourcing as one emerging as-

pect of the new role of IS executives, and he wanted to share in leading his colleagues — not necessarily to outsourcing, but to that new role.

One enthusiastic disciple was



Biddle envisioned a transformation in IS management

Avon IS chief Ray Perry, who is now a vocal *opponent* of outsourcing. But Avon looked long and hard at it, then made other changes — data center consolidations — that now save the company \$3 million a year.

Perry has publicly credited Biddle with sparking the thought process that led to those savings. Biddle wasn't so much pro-outsourcing as he was pro-effective

IS management.

Biddle clearly enjoyed the limelight but eventually found the conference circuit just too demanding. The outsourcing trend he helped create had turned into something of a monster, with a conference every month, or so it seemed, and he put the brakes on public speaking for a while. He had more on his plate back at the office, too — some new non-IS responsibilities at American Standard that exemplified the emerging CIO role, of which Biddle was a model.

Biddle loved to look ahead. At the end of our discussion on that January morning in New York, I remember Biddle sitting back in his chair across the coffee table and musing about the future of IS management. He saw it evolving into something very, very different in the 21st century, and he even speculated that the concept of an IS function might disappear altogether.

Whatever transformation our profession will undergo in the years to come, I'm sure that Gary Biddle would have played a big part in it. It's a real shame that he won't be with us to watch it happen.



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## Finally coming into its own

Reverse engineering technology makes headway into IS organizations

### ANALYSIS

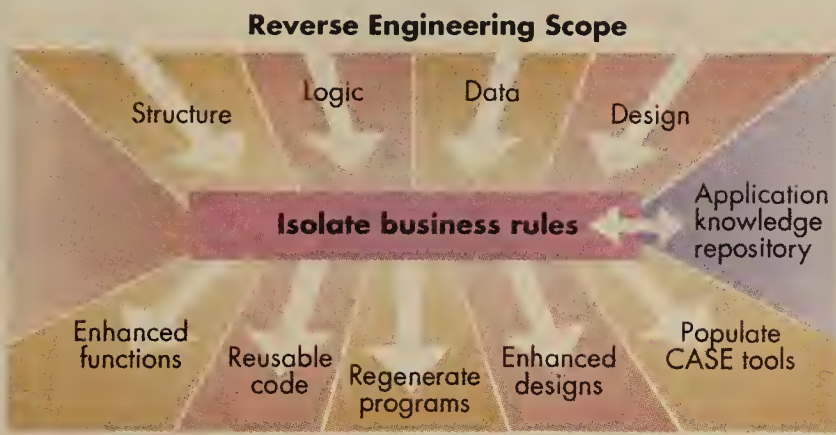
BY JOHANNA AMBROSIO  
CW STAFF

Users who are beginning to experiment with reverse engineering and re-engineering tools report top-notch results. But they also say the process is slow going and hard to get one's arms around.

The experience is remarkably similar to what early users of computer-aided software engineering (CASE) tools went through several years ago. The re-engineering and reverse engineering software markets are just beginning to take shape, with increasing numbers of vendors and tools (see story page 37). But because no single vendor provides a complete solution, users must rely on a mix of tools from different sources.

### Rules of business

Identifying business needs lies at the heart of reverse engineering



Source: Gartner Group, Inc.

CW Chart: Doreen St. John

Another similarity between CASE and these other technologies is that "they have been overpromised and overhyped," said Marc Fey, chairman of XA Systems Corp., a vendor in Los

Gatos, Calif. As with CASE, definitions for re-engineering and reverse engineering vary widely. Ask five different experts for definitions, and you are likely to get five different answers.

Still, the broad consensus by users, vendors and observers is that re-engineering refers to restructuring and modularizing code in existing applications. This is commonly known as turning "spaghetti code" into structured code. This code can be more easily maintained in existing applications and reused in new ones.

"It's taking an existing application and recasting it for a new set of needs — migrating to a new platform or a new database management system, for example," said Ed Acly, director of software research at Technology Investment Services Corp., an arm of International Data Corp. in Framingham, Mass.

Reverse engineering takes re-engineering a step further. In this scheme, one extracts the data definitions and process definitions from existing applications and stores those definitions and models in a repository. These definitions and models can then be used to generate new code for existing applications

*Continued on page 36*

## Mainframe imaging ties take lead

BY SALLY CUSACK  
CW STAFF

NEW YORK — Integrating information from mainframe applications with imaging systems was a mini-theme at the Imaging '90 show earlier this month, as vendors scrambled to dominate the limelight.

Bull HN Information Systems, Inc. stepped into the realm of document image management with Imageworks — a client/server-based suite of document management software optimally designed for Bull's DPX/2 family of Unix processors. It can run on other vendors' Unix systems, and programs can be developed on an IBM mainframe to subsequently function as a client to the Bull server.

According to Najah Naffah, director of Bull's multimedia product line, Imageworks incorporates several industry standard technologies, including DOS, MS Windows, Oracle and Transmission Control Protocol/Internet Protocol (TCP/IP), thus rendering it ideal in the large mainframe world of government agencies, corporations, banks and insurance companies. It would communicate with mainframes via TCP/IP.

The initial delivery platform for Imageworks is a Bull DPX/2 Unix server providing folder and document management, optical discs and jukebox management as well as communications for Zenith Data Systems personal computers. The PCs will function as clients connected via TCP/IP and Ethernet for image capture, retrieve and/or print functions.

*Continued on page 36*

## Infodata upgrade links DBMS, workstations

BY ROSEMARY HAMILTON  
CW STAFF

Infodata Systems, Inc. rolled out an updated version of its text management system last week that provides workstation support and links to relational database management systems.

Current Inquire/Text users who were contacted said they are anxious to take advantage of the added functions. Company officials said Release E is now shipping, and its workstation support component will be available next month.

Initially, the company will of-

fer Microsoft Corp. MS-DOS support. It plans to offer IBM OS/2 support but did not specify a date.

Inquire/Text provides storage and search facilities for textual data. Unlike an imaging system, it does not provide a view of an actual document. But it also provides higher level search and retrieval capabilities than some imaging systems.

"It's probably the best release we've seen in a number of years," said Richard Stevenson, manager of database administration at Burroughs Wellcome Co. in Research Triangle Park, N.C.

"There are some big changes in there."

Burroughs, which has been using Infodata's software since the early 1970s, is particularly interested in the SQL Bridge facility, which it recently beta tested. The company started using IBM's SQL/DS mainframe database earlier this year, and Stevenson said the Infodata tool will allow users to merge data from Inquire/Text databases and SQL/DS into one document.

Armstrong World Industries, Inc. is a new Inquire/Text user that hopes to bring in the workstation support soon. Tom Brown, a senior systems analyst, said Inquire/Text was selected this year to manage product information on-line. A pilot project was recently completed for the customer service department that would allow customer rep-

resentatives to search for product records on-line. Personal computer support would give customer representatives a more user-friendly front end to the databases.

Towers Perrin, a management consulting firm in New York, is hoping to begin testing the workstation support within the next month, according to Nancy Audino, supervisor of information resource management.

Audino said the company would like to eventually use the workstation support to help create "consultant workstations," so staff members can more easily search through Inquire/Text and use client data.

"We want to make it easier for them to get at the corporate intelligence on the system," Audino said.

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Chief Technology Officer  
Computer Task Group



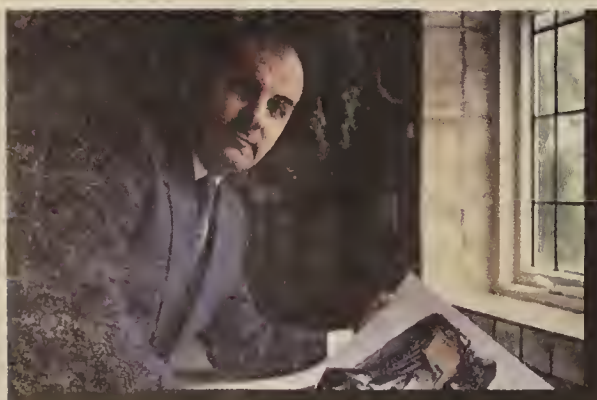
"I've seen other CASE tools fail, so I raised the bar high when we evaluated the IEF. It passed with flying colors. I could not be happier with my decision to adopt the IEF company-wide."

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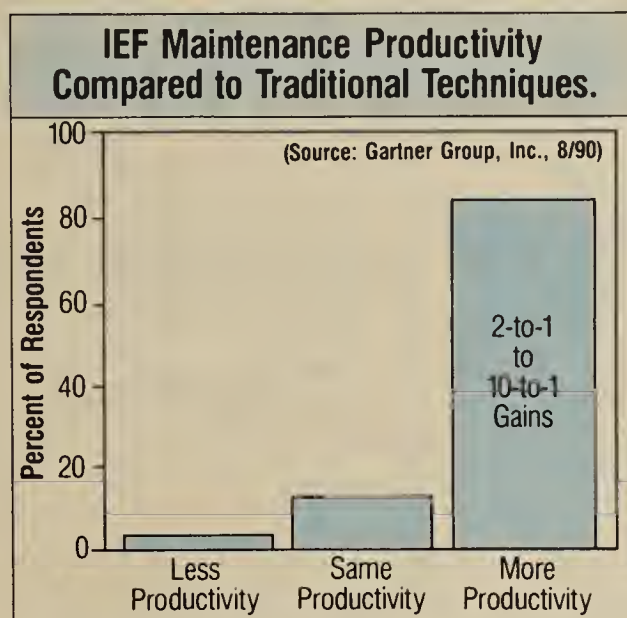
The quality of IEF-developed systems is remarkable. In recent CASE research by The Gartner Group, application developers were asked to report the number of abends they had experienced. (An "abend" is a system failure or "lock-up" caused by code defects.) IEF developers reported zero defects—not one abend had occurred in IEF-generated code.

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In this same study, developers were asked to compare IEF maintenance productivity with their former methods. Of those responding, more than 80 percent had experienced gains of from 2-to-1 to 10-to-1. (See chart.)

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# Multitier team attacks paper

## ON SITE

BY SALLY CUSACK  
CW STAFF

IDAHO FALLS, Idaho — A nuclear research facility here has procured an elaborate imaging system in hopes of organizing and restructuring several hundred million warehoused documents — a paper fallout that has been accumulating during the past 40 years.

"Whenever we needed something that dated back a few years, we literally sent a small army out to the warehouse to search for it," said Bernard A. Rando, principal information science specialist at EG&G Idaho, Inc. The federally funded facility recently installed three Wang Laboratories, Inc. Wang Integrated Image Systems (WIIS), with a total value reportedly exceeding \$800,000.

The unusual twist here is that the EG&G also relies on an IBM 3090 Model 200 mainframe running in the MVS/ESA operating environment, according to

Rando, which will connect with the Wang system via Norms, a mainframe-based document control and records management system from Southern Electric International (SEI). Norms links up to the imaging platform via 802.3 Ethernet lines to allow documents that are scanned into the Wang system to be addressed by the mainframe.

When a document is scanned in, Rando said, the interface between Wang and Norms identifies the document and the Wang machine on which it resides. Then Norms hands the address back to the Wang machine, and the imaging applications put the record up on the screen for the user. So far, more than 10,000 pages have been scanned in three weeks, he added.

EG&G chose Norms because of sophisticated search and retrieval capabilities; the facility anticipates being able to search through 3 million records in 1.5 seconds.

"The IBM software just reaches out to the Wang system

and passes out addresses," Rando said, explaining that the search mechanism resides within the Norms program and the storage is on the Wang side of the house, via Wang's Image/CICS program.

The hardware portion of the WIIS installation includes two VS 5640s and one VS 8220 com-



puter, two Wang 5¼-in. optical disc jukeboxes, four document scanners, 12 image-capable workstations and two laser printers.

On the software side, EG&G is using Wang's Pace database management package, Wang Open/Image-CICS, Wang Office and Office/Profs Gateway, 802.3 local-area network connectivity and Open Systems Networking. All the systems are connected, Rando said. He added that

EG&G also plans to communicate with other agencies via Wang's VS Fax gateway, which permits facsimile transmission of images from a Wang VS mini-computer.

"One of the priorities we had was flexible software for application development," Rando said. "We need to be able to change this on the fly. The biggest problem we've encountered during the entire process is trying to control the growth of this technology."

Rando began researching optical disc technology more than two years ago, trying to determine which platform would be best for EG&G and its employees.

The mammoth site spreads out over 894 square miles — about the same size as Rhode Island, Rando noted — and employs approximately 12,000 people. There are more than 10,000 users networked into the IBM mainframe, and security permitting, there will be sitewide access to the imaging system when all is said and done.

After two months in beta testing, the WIIS implementation went into official production mode last month. EG&G has a

five-year plan to scan in all the warehoused documents, and according to Rando, it will need additional manpower to complete this task.

"We will also need between five and eight more scanners," he noted, adding that he has also received requests for additional imaging systems.

As the prime contractor for the Idaho National Engineering Laboratory (INEL), EG&G provides facility services to other research contractors at the INEL site, including data processing, mail and security. The need for configuration control, records management and compliance with federal and state record retention regulations were the primary forces driving the move to imaging technology, the company said. Wang won the contract in a competitive procurement bid.

The U.S. Department of Energy headquarters in Washington, D.C., currently communicates with the IBM mainframe via Digital Equipment Corp.'s All-In-1 and IBM Professional Office System packages and will eventually connect to the Wang system through the mainframe, according to Rando.

## Access ventures into text management waters

BY MARYFRAN JOHNSON  
CW STAFF

Access Technology, Inc. made its splash as the leading spreadsheet vendor for Digital Equipment Corp. VAXs, but these days the Natick, Mass.-based vendor is casting its line into new waters.

Rather than concentrating solely on the joy of manipulating numbers, Access is broadening its scope with two new "groupware" text management products: For Comment and For Words. The \$32 million company is also itching to put its applications on Novell, Inc. local-area networks.

"This is a dramatic shift in their product strategy, but it's not a dramatic shift in company policy," said Ronni Marshak, a vice-president at Patricia Seybold's Office Computing Group in Boston. "Access has been making products for group usage, so the company has experience designing network products vs. stand-alone tools."

For Comment is a document review system, priced from \$375 to \$9,900, that enables work groups on networks of personal computers and DEC VAXs to read, comment on and revise a text document on-line.

For Words is a document retrieval system that gives

VAX/VMS users the ability to hunt through an on-line database to find particular documents. It costs from \$600 to \$25,000.

### Grant writer's aid

One user planning to buy both products is William Wiseman, business manager at The Children's Museum in Boston. "I can see a direct application with For Comment in our grant writing," Wiseman said. "For Words could be put to immediate use by our more technical people, such as computer support staff."

The museum has about 80 users on a VAX 6000 Model 310, plus a dozen Decserver machines. Wiseman said that the VMS operating system has some of the features found in For Words, but not the flexibility of the Access product.

Allan Wood, the business applications coordinator at STS Consultants Ltd. in Northbrook,

Ill., is also pondering a purchase of For Comment for the engineering firm. "It could be a real nice fit into our environment," he said. "We'd be able to run it on all our VAX nodes" in four locations throughout the Midwest.

Wood said that although STS is already using Vaxnotes, a DEC conferencing software package, it is mainly used for on-line software documentation and lacks the document editing capabilities of For Comment. The Access product also integrates with several popular word processing packages, while Vaxnotes cannot.

One feature users at a recent Access convention in Boston particularly liked was the split-screen format in For Comment, which enables viewers to scroll up and down both the document and comments from reviewers.

The original version of For Comment was introduced by

Broderbund Software in 1986 and was hailed as one of the first useful work-group software tools for PCs. Access acquired an exclusive license to the technology, improved the user interface and added other functions.

"In this kind of market, with the recession and everything so tight, a software company can't just go to its existing customers and make money. They don't have as much to spend," Marshak said.

Analysts familiar with the new products praised them but said they needed better graphical presentation and the ability to run in windows.

Yet the market seems ripe for full text retrieval products at an estimated \$100 million last year, said Ann Palermo, an analyst at International Data Corp. in Framingham, Mass. "The problem with For Words right now is it only works on VMS," she added.

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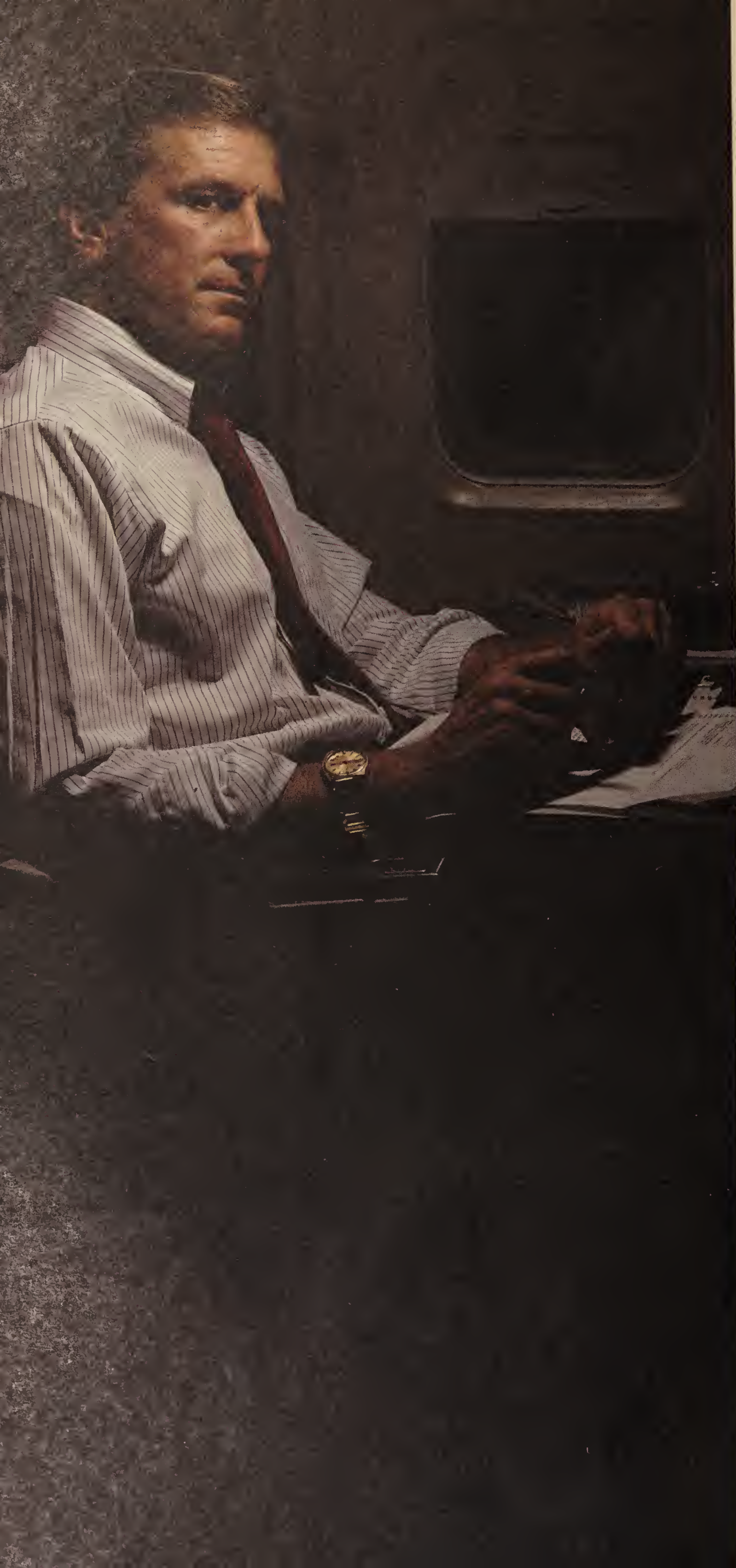
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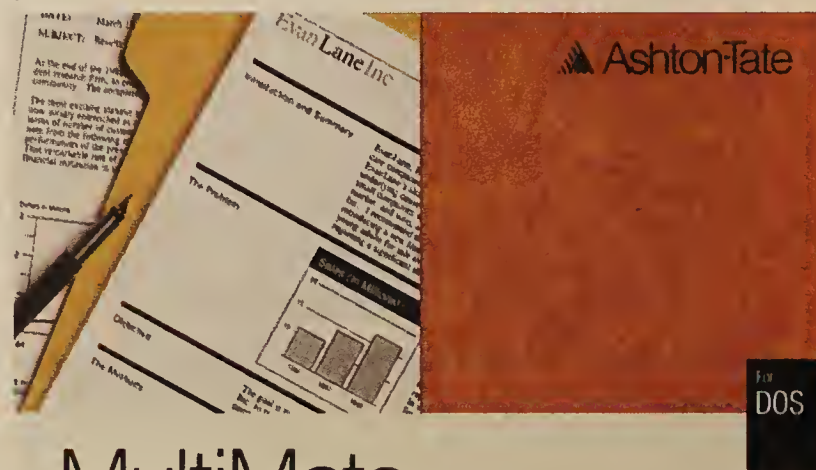


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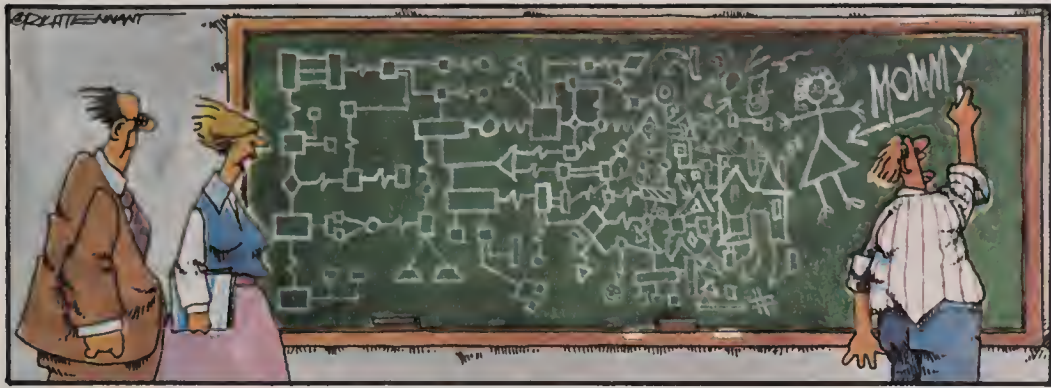
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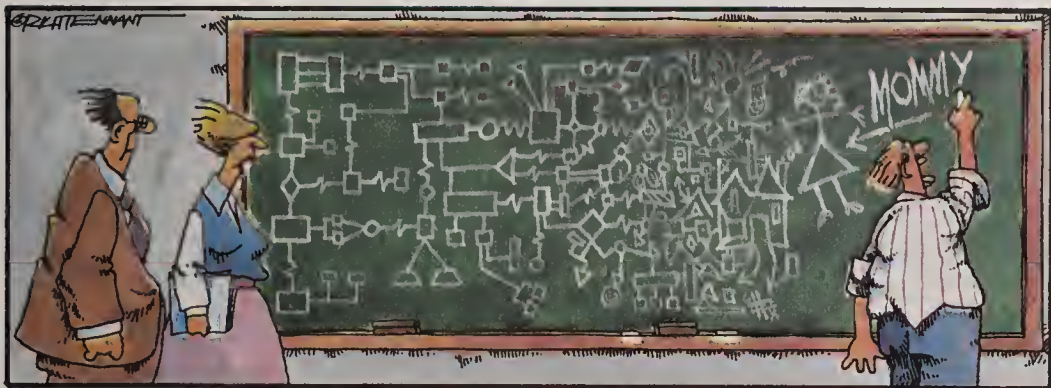
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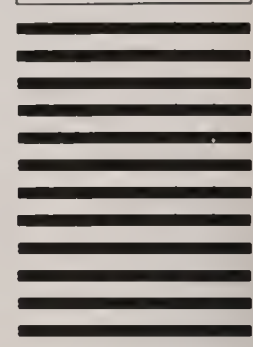
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# PRODUCT REVIEW

## Solid case for Linc performance

### Unisys Corp.

This is the fifth in a monthly series of performance benchmarks that for the next several months will focus on the integration of computer-aided software engineering (CASE) and fourth-generation language (4GL) products. The benchmarks are monitored by an independent team headed by David Whiteside, managing director of Computing Futures Ltd. and his associate, Prof. Eberhard Rudolph, formerly of the University of Auckland, for exclusive publication in Computerworld.

Each product is observed in action over a three-day period during which a vendor team solves the case study project costing system, an application that is familiar to most information systems professionals. The team's mission is to demonstrate the capability of the major CASE/4GL environments to deliver complete and complex

business solutions under "live fire" conditions. In this issue, we take a look at Unisys Corp.'s development tool set, which is centered around Linc Design Assistant (LDA), Linc, Mapper and its database DMSII.

Carried out by Unisys at its corporate case center located in Malvern, Pa., its team of four professionals provided a comprehensive solution to the benchmark and earned it a total rating of "excellent" for the level of completion category.

The team required 18 hours to complete the benchmark and its enhancement. However, this time could have been reduced by two hours had it not been for the lengthy periods that were spent waiting for compilations, particularly during the enhancement stage. The overall effort of 42 man-hours was one of the fastest compared with previous solutions, frequently exhibiting "right the first time" results. Thus, we gave the speed of de-

velopment category a rating of "very good."

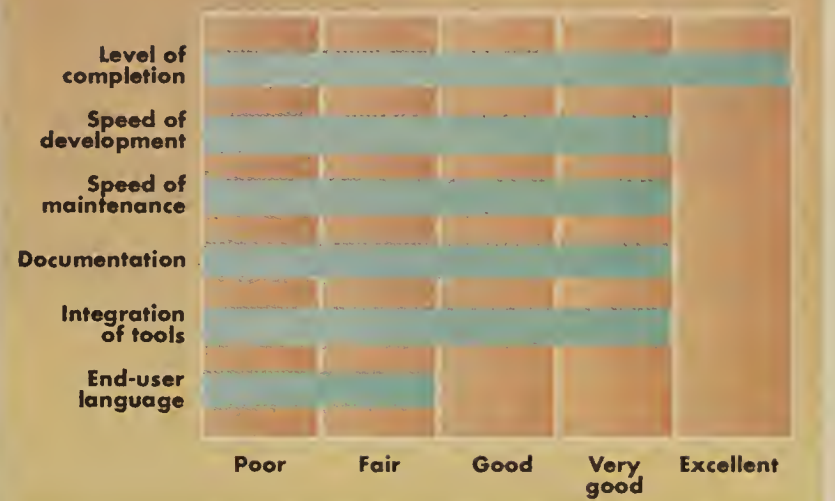
A similar performance was achieved for maintenance in areas where the team built on the existing high-level framework of Linc constructs. Therefore, the speed of maintenance was also rated as "very good."

The fast development speed was supported by high-quality documentation. Effective CASE graphics complemented well-indexed program listings. In addition, during maintenance, a reverse engineering capability ensured the integrity, even in

### The Unisys tool kit

- Linc Design Assistant (LDA) — Upper CASE tool
- Linc — Lower CASE tool or 4GL
- Mapper — End-user decision support language
- DMS II — Database language that includes SQL support

### Consultant's assessment



the high-level documentation. All things considered, a rating of "very good" was awarded for documentation.

The integration of the Mapper end-user tool is limited to the database level and is not covered by the LDA CASE tool. However, the Linc 4GL and the LDA CASE tools are fully integrated, providing bidirectional engineering support. For the level of integration, we gave the tools a rating of "very good."

Surprisingly, we found the end-user languages to be too programmer-oriented and not easy to comprehend by non-IS staff. Hence, the results may have suf-

fered from hardware problems that required a change of environment and a hastily co-opted team member. What we saw had to be given a mark of "fair" at best.

We saw a high level of accomplishment in most areas of the solution, but Unisys still has to give Mapper a face-lift in order to make it a broad end-user tool as well as part of its CASE environment.

In conclusion, Unisys has a well-integrated tool set that was especially effective in handling the more complex elements of the benchmark. It is unfortunate that the tool set is only available on Unisys hardware.

## Development and maintenance report card

Performance in each area is graded from A (excellent) to F (poor).

### ANALYSIS AND DESIGN: B

The team implemented the proven Linc methodology as the basis for analyzing and structuring the benchmark specifications. They were then able to directly implement the conceptual Linc solution using the Unisys LDA CASE tool. The Mapper end-user solution, however, could not be addressed by the CASE tool.

**Strength:** All have a fully integrated design philosophy.

**Weakness:** The CASE tools are available in single-user personal-computer mode only.

### DATABASE SETUP: C

Only the data elements have to be specified in the CASE data dictionary. The database implementation was swift, but it was limited in its scope because of the many editing rules that have to be implemented in the Linc program logic area.

**Strength:** All physical data structures are generated automatically.

**Weakness:** There is no data dictionary support for the Mapper tool.

### FILE MAINTENANCE

#### TRANSACTIONS: B

The Linc default framework handled the simple screen processing in most cases. Screen scrolling required special attention.

**Strength:** Simple processes are handled effectively.

**Weakness:** It has unorthodox change and delete functions.

### COMPLEX

#### TRANSACTIONS: A

In the short time it took to complete the benchmark, a correct solution was derived with hardly any bugs. The Linc defaults also

gave adequate support.

**Strength:** Not much coding needs to be done.

**Weakness:** Time calculations are unsupported.

### INQUIRIES: D

Linc and Mapper were each used to develop one of two inquiries. In both environments, the development process was lengthy and relatively cumbersome. Professional programmer skills were needed, particularly to extract the files for the Mapper solution.

**Strength:** It is easy for the experienced professional.

### Staging the benchmark



**Weakness:** It is beyond the capability of the casual end user.

### COMPLEX REPORTS: A

As with the complex transaction, Linc was able to handle intricate reporting requirements. The fastest time to date — three hours and 35 minutes — was achieved. It is interesting to note that two developers each took a section of the report.

**Strength:** There is great flexibility in report generation.

**Weakness:** There is none evident.

### INTERFACE: A

The Ashton-Tate Corp. Dbase file was transferred as an ASCII file and edited before a Linc batch program transferred the

data into the Linc database. The task was completed in a short period of time and even uncovered a bug in the specifications.

**Strength:** External data can be dealt with easily.

**Weakness:** No standard Dbase interface is provided.

### ENHANCEMENT: A

After an hour of analysis, the team implemented a solution to the enhancement requirement using Linc. They then used reverse engineering to reflect this low-level change in the upper-level design documentation.

**Strength:** Linc methodology is geared for change.

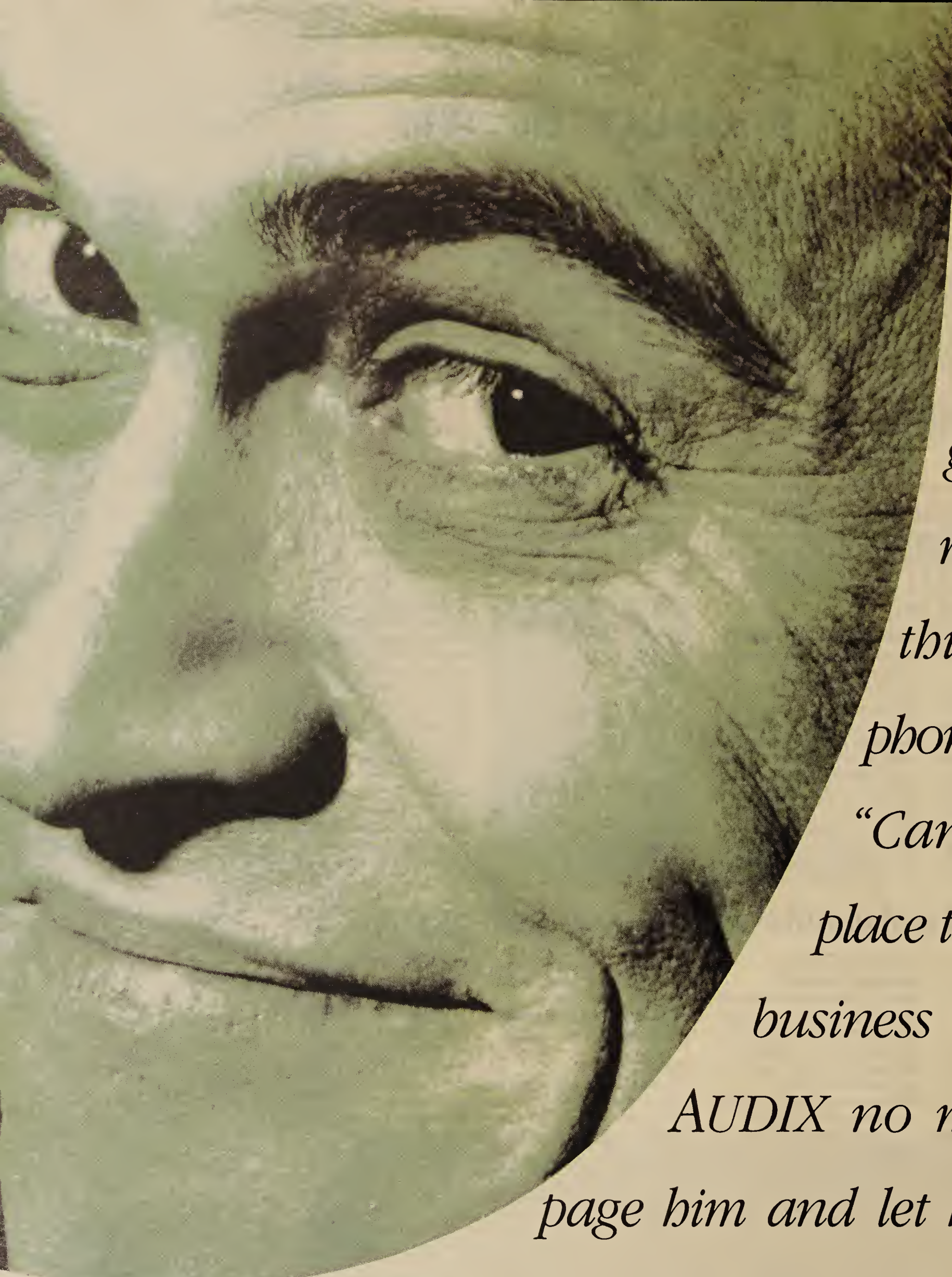
**Weakness:** Recompilations can be lengthy and impose scheduling restrictions.

The solution was initially developed on a Unisys A6 mainframe, which was dedicated to the benchmark team and supported as many as 12 stations. The Mapper development had to be transferred to a Unisys A12 mainframe because the A6 microcode did not fully support Mapper.

Details of the product are available from Unisys Corp., P.O. Box 500, Blue Bell, Pa. 19424, (215) 986-4011.

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*up satellites like flowers to strangers. On one we  
electronic greeting card and addressed it to infinity.  
occurs to me, what if the people who might get  
signal from planet Earth aren't around when it  
What if they're in a meeting? And the only  
thinking this is because I'm on the tenth ring of the  
this supplier when someone finally answers the  
the ringing noise is ruining his lunch. He says,  
message?" And I say, "Tell Ray he needs to work for a  
AUDIX System from AT&T. Tell him 75% of all  
reach their intended party on the first try. But with  
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important messages are waiting. And this is impor-  
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# Open systems escape scrutiny

BY J. A. SAVAGE  
CW STAFF

Businesses that have embraced open systems have not justified the expense with reams of cost analysis, according to a report from the DMR Group, Inc. in association with Uniform Association and X/Open Consortium Ltd.

Instead, companies use informal economic justification — the Bob Dylan approach. "You don't need a weatherman to know which way the wind blows," the report stated. More than 100 individuals in organizations that have bought or are in the midst of buying open systems were questioned. A secondary poll, with 2,375 general respondents, indicated the strength of the trend toward the open systems market.

DMR's studies found that 15% of the businesses polled were considering the use of open systems. Nearly one in six sites that already have Unix-based computers have explicitly adopted open systems standards. "The evidence is that the shift is occurring," said Don Tapscott, vice-president of DMR.

Among the findings are the following:

- More than half of the organizations that bought into open systems did so in the last two years.
- Price/performance may be the most important criterion, but users also want traditional vendor support and service.
- Vendors may say they adhere to standards, but users are actually keeping track of that conformance, either by developing internal expertise or hiring consul-

tants to validate vendor claims.

• The moves to open systems are either making management problems between central IS and distributed entities worse or raising them for the first time.

Despite the lack of cost justification, cost is still the most important factor, according to DMR. Almost as important, however, is that users feel the direction of open systems as the wind of the future, and they want

to be able to take advantage of open systems freedom. The report said there is a "striking" shift in the relationship between users and vendors — that users are empowering themselves by choosing open systems. DMR cited one case in which a customer had two vendors vying for its attention, suggesting that the customer buy the vendors' open systems hardware over its proprietary systems. The customer went one step further, taking the vendors' advice on open systems and buying systems from a completely different vendor.

While all these moves signal a change in the basic structure of IS, one of the most significant changes, and one which has yet to be played out, is that of a relationship between a centralized IS and departments. On one hand, with open systems, an organization reaps the utility of dispersed systems as part of a wider corporate system based on standards, according to the report. On the other hand, "most [managers] are working in the dark" because there is little experience with management forms that work best under such conditions.

## Unisys, Chorus develop another version of Unix

BY JOHANNA AMBROSIO  
CW STAFF

SAN JOSE, Calif. — Get ready for another version of Unix. This one, being developed by Unisys Corp. and Chorus Systems, Inc., is intended for high-end machines.

"This is not a product announcement; it is a technology announcement," said Jamie Riotto, director of engineering in Unisys' Unix Products Group. He said the operating system will run on a high-end Unisys machine that the company has not yet announced.

The partnership, announced earlier this month, has a goal of developing a Unix version "equivalent to what you have on today's mainframes," said Hu-

bert Zimmerman, chairman and founder of Chorus Systems in Beaverton, Ore. The operating system, which will be based on Chorus' kernel, will support distributed, scalable, fault-tolerant hardware and will provide a single system image and security features, he said.

The operating system will be compatible with AT&T's System V, Release 4. "Customers will not have to rewrite any applications," Riotto said.

The first release of the Chorus/Unisys software will be available in the first half of 1991. "It will find its way out in stages," Riotto said, with the final stage available in 1993. At that point, the operating system will support fully distributed computing.

## Mainframe

FROM PAGE 25

"This product line is not limited to Bull accounts," says Nafah, with reference to Imageworks positioning toward mainframe systems integration. He contends that the majority of imaging products currently on the market are positioned as self-contained, departmental systems operations, whereas the Imageworks open architecture, client/server approach allows the image database to be placed in front of the mainframe for easy access to mainframe transaction-oriented environments.

Imageworks is available through Bull's direct sales force, and pricing is determined by the systems integration implementation, the vendor said.

In other announcements, Information Builders, Inc. and Wang Laboratories, Inc. joined forces to premier Focus for Wang VS Image Gateway. The new product allows firms to incorporate existing data and applications on the mainframe as well as IBM Application System/400 minicomputers linked with Wang's imaging systems.

According to Focus, documents are stored and maintained on the Wang VS Image Server, and Focus for Wang VS and the Image Gateway transparently link the document image to data and applications on the mainframe and AS/400. This creates a screen-level data exchange between systems. Focus for Wang VS Image Gateway is available now, with prices ranging from \$1,658 to \$18,090, depending on the VS hardware platform.

## Reverse

FROM PAGE 25

and for new applications. This process does things such as consolidating data definitions. Thus, where re-engineering involves reworking existing code, reverse engineering deals with higher-level definitions of processes and data.

If defining these ideas is tough, putting them into practice can be extremely rewarding. Tom Wheeler, an administrator at Aetna Life & Casualty's Personal Financial Security Division in Hartford, Conn., has been using re-engineering tools since 1986 to update an application containing 3 million lines of code. The application includes an on-line module, a 25-year-old master file containing information about every individual's property and casualty claim and a reporting module.

Wheeler said the maintenance staff for that application has been reduced from 28 to eight people, freeing up those

programmers to work on new systems. Also, the application's 15,000 data names are now down to about 2,000.

The next step, Wheeler said, is to reverse-engineer the logic and process definitions in the old application to allow them to be moved from Aetna's home-grown DBMS into IBM's DB2. "The paint is still wet," he said. "We're looking at everything. We know reverse engineering is part of our future; it's just not clear yet which tool we will use."

Maxine Glassberg, manager of Merrill Lynch's Development Technology Center in New York, has also been using re-engineering tools for some time with great success. She is now beginning to experiment with reverse engineering in some pilot programs. Early results indicate a 40% reduction in the number of lines of code and the ability to reuse 80% to 90% of the code that is generated.

However, there is a downside to all this productivity. Getting started can be difficult because it is not always easy to justify these

tools to top management, said one user who requested anonymity: "It's hard because the vendors don't always understand the business need behind the technology. We need to justify things by being able to cut dollars and head count."

Then, too, users must do a lot of their own work to coordinate the different software and steps involved. Merrill Lynch, Aetna and Pacific Bell, also working with re-engineering and reverse engineering tools, are using at least four packages from different vendors.

For the time being at least, these tools are only available for Cobol programs. Peter Van Opens, a systems coordinator at Northwestern Mutual Life in Milwaukee, has been re-engineering his PL/1 applications manually. It took him and his staff 2,000 hours to restructure the code in an on-line query system. However, he said he is happy with the results — where it used to take 500 hours to make any changes to the system, now it takes only 50 hours.

## Working with the right tools

A plethora of tools has hit the market for tasks such as extraction of data specifications and code analysis.

While software aids for restructuring code have been around for eight years or so, the analysis tools are relatively new. These help users figure out what applications exist in their shops and which could most benefit from restructuring. Other packages help users identify what code is in existing systems, down to the detail of which code performs which function — a specific interest calculation, for example.

In this analysis category are such products as VIA/Center and VIA/Insight from Viasoft in Phoenix and Pinpoint and Inspector from Language Technology, Inc. in Salem, Mass. Another analysis package is Pathvu from XA Systems Corp. in Los Gatos, Calif.; the company also sells Datatek, a tool to help clean up data definitions.

Further, XA will soon announce System Analyzer, a systemwide way to analyze applications' component pieces and their relationship to one another. This information will then be stored in a DB2 database.

Complete reverse engineering tools are not

yet available. "There's no true reverse engineering tool. You can capture data and code from existing programs, but you can't pull out of running Cobol code what it's doing and why," said Peter Mimno, an independent consultant in Marblehead, Mass. "You cannot capture the process."

Index Technology, Inc. in Cambridge, Mass., is trying to change that with XL/Recover, introduced in September. The company said the software captures both data and process information.

Another vendor vying for this market is Bachman Information Systems, Inc. in Burlington, Mass. It has released a product called the Bachman Analyst that will eventually address all of these areas.

Also coming in this area is Renaissance from Viasoft. It will extract the data, process and logic information from Cobol programs, save those rules in a repository and allow those rules to generate new code.

CASE vendor CGI Systems Inc. in Pearl River, N.Y., also has a reverse engineering tool in beta test. More CASE vendors are expected to enter the market soon.

JOHANNA AMBROSIO





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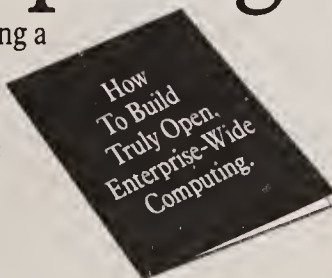




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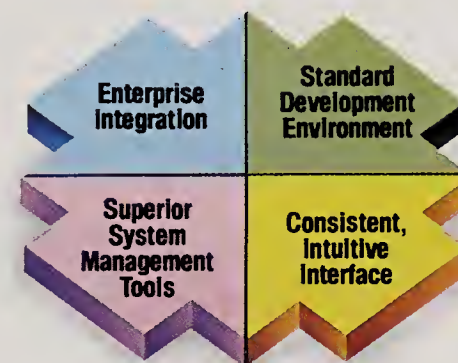


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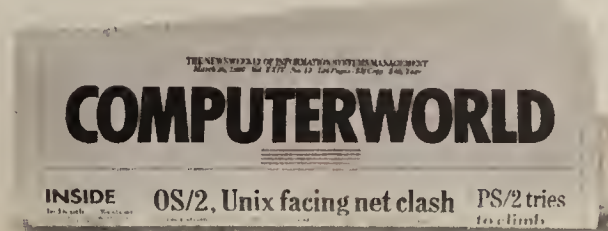
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# PCs & WORKSTATIONS

## COMMENTARY

Michael Fitzgerald

### Channel interference



*Busy reader, please note: unless you currently use a Micro Channel Architecture (MCA, with all due deference to the film company, which has recently become touchy about this) or Extended Industry Standard Architecture (EISA) machine, what you are about to read really has no practical value for several years, so clip it and save it until then.*

IBM makes for an easy target, and thus it naturally gets hit a lot. In fact, it's fairly easy to say that the big computer maker (or is that the maker of big computers?) is basically out of touch with what users want and generates sales largely because people and corporations are slow to change. Therefore, they continue to buy mainframes, and because they buy their mainframes from IBM, it's not much of a stretch to also buy IBM's personal computers, no matter how slow and overpriced.

Sometimes, it gets too easy to point fingers. Take this month's announcement of the the Micro Channel Developers Association (MCDA), which has an executive committee consisting of IBM and 13 other companies. Now, it's easy to

*Continued on page 48*

## I486 systems find right balance

### ANALYSIS

BY RICHARD PASTORE  
CW STAFF

Though observers initially feared that the Intel Corp. I486 chip might be too fast for the rest of the machine, today's 486-based personal computers appear to be both fleet and well-balanced, analysts said.

For the most part, vendors appear to be supplying users with PC components that are capable of keeping up with the central processor. Potential bottlenecks such as disk drives and display I/O have been tweaked with a variety of controllers and caching technology.

"Most designers have wrestled with the bottleneck problem and come up with different ways of solving it," said Paul Zagaeski, a PC analyst at the Yankee Group in Boston.

Users of 486 machines seem satisfied with the early power boost the boxes have given them and have not noticed component performance problems.

"We really don't seem to stress them hard enough to really see any degradation," said Arthur Block, vice-president of end-user automation support at Manufacturers Hanover Trust in New York. With 486s employed as network and application servers, Block said he is confident enough in their performance

benefits to consider purchasing several more for use as stand-alone workstations.

To secure a well-balanced 486 system, it is practically a given to employ a 32-bit I/O bus. "The people who are suffering are the ones who are putting a 486 on a 16-bit bus. You have a bog-down at that point," said Dave Kirkey, vice-president of sales at Advanced Logic Research, Inc., a vendor specializing in high-end boxes.

After the I/O path, the most obvious performance bugaboo is magnetic storage, which marks its responses in milliseconds while the CPU conducts its business in microseconds. This gulf is not likely to disappear, but

vendors have taken steps to add CPU zip to at least some disk seeks.

"They are using techniques that have been used for 15 to 20 years in the mainframe business — caching," said James Porter, president of Disk/Trend, Inc. in Los Altos, Calif.

Disk caching is the most common speed-boosting technique employed in 486 PC storage. A small amount of semiconductor memory resident on a disk caching controller holds that data the controller predicts will be most often used. That data can be accessed in microseconds, because no disk rotation or drive arm positioning is involved.

Disk caching is an inexact science, however. Hit rates — the chance that the data the user needs will actually be in the

*Continued on page 52*

## Intel 32-bit chip bids for laptop market

BY MAURA J. HARRINGTON  
CW STAFF

BURLINGAME, Calif. — In a bid to corner the fastest growing sector of the personal computer market, Intel Corp. recently introduced the latest in its family of 32-bit microprocessor chips, the 80386 SL Microprocessor Superset.

Developed specifically for laptop and notebook-size PCs, the 386 SL and its peripheral counterpart, the 82360 SL, could increase the battery life in laptop and notebook-size computers by as much as 50% while taking up 40% less space on the motherboard, claimed Mike Aymar, vice-president and general manager of Intel's Santa Clara, Calif.,

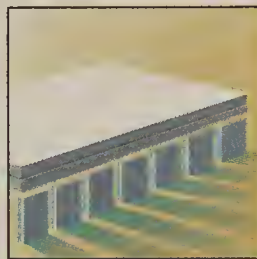
Microcomputer Division.

The Intel chip set, according to Michael Slater, editor and publisher of "Microprocessor Report," provides an opportunity for computer manufacturers to produce a wide variety of notebook and laptop computers because of its power management capabilities and because there is extra room available on the motherboard to add peripherals.

Aymar said users will also benefit from the power management features built into the 386 SL chip.

For example, the chip set's system management mode in-

cludes a system management interrupt capability said to allow a user to simply shut the notebook or laptop PC in mid-task without losing any completed work.



While this capability is already available in small computers for applications running on 16-bit processors, the Intel 386 SL brings the technology to the 32-bit level, Aymar said.

According to industry analysts, there could be some notebook and laptop announcements incorporating the new chip set as early as this November, possibly at the Comdex/Fall '90 trade show.

Although Slater said Intel is the first vendor to his knowledge to formally introduce a 386-based, two-chip chip set for notebook-size computers, it is not the first to market a condensed PC chip set.

Santa Clara, Calif.-based Advanced Micro Devices, Inc. (AMD), a smaller rival of Intel, introduced its "PC-on-a-Chip" product two weeks before Intel's 386 SL Superset announcement. The product places the CPU and I/O peripheral devices for 80286-based computers on a single chip.

Full production of the Intel Superset 386 SL chip set is scheduled for the first quarter of 1991, the company said. The AMD AM286ZX is scheduled for production in volume by the second quarter of 1991, according to AMD.

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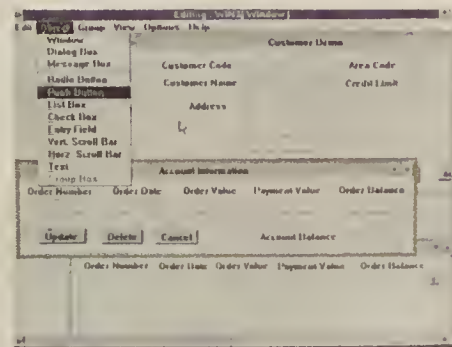
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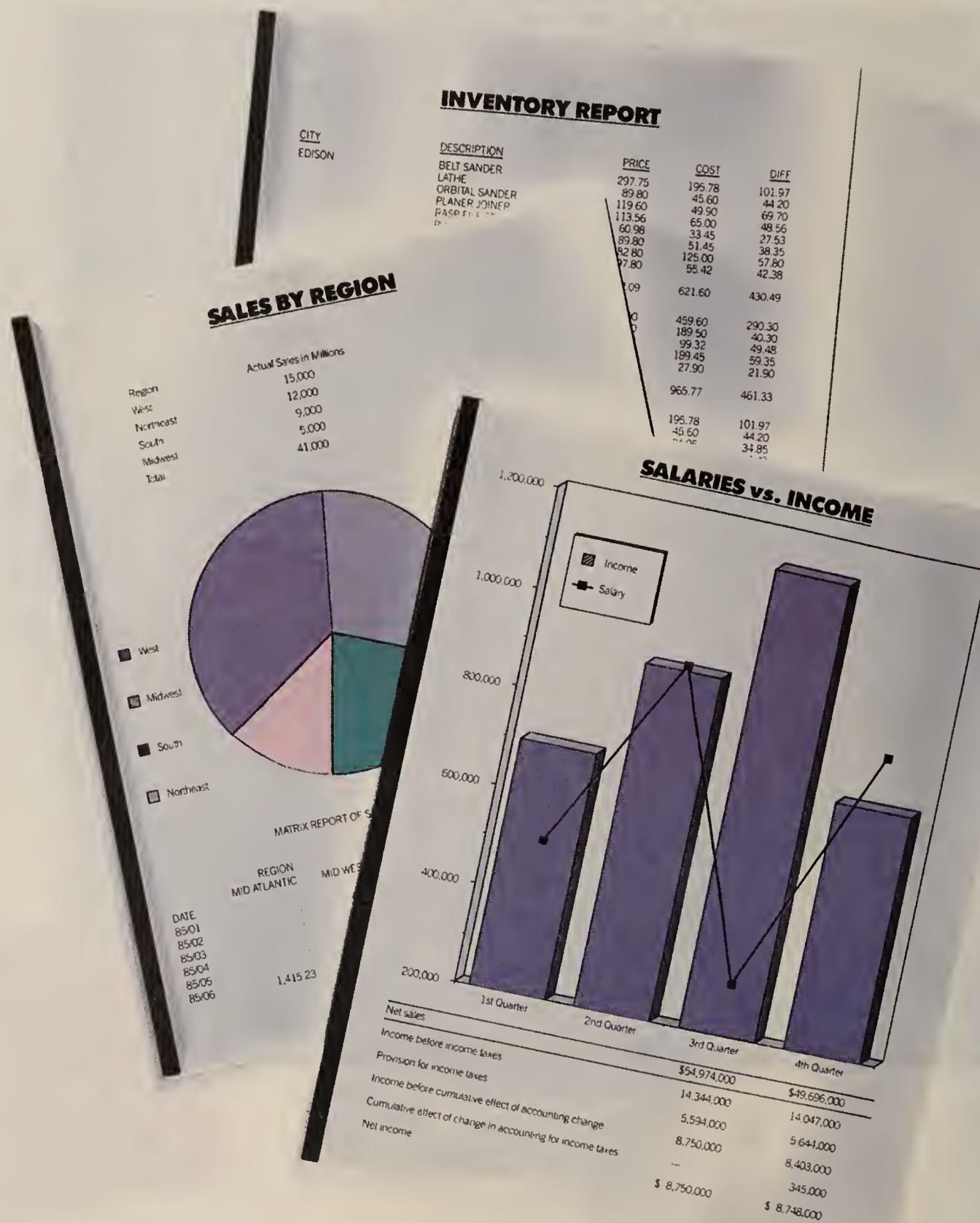
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# Nantucket tackles Clipper bugs with fixes

BY PATRICIA KEEFE  
CW STAFF

The release of the generally well-reviewed Clipper 5.0 from Nantucket Software, Inc. has not been without its problems. Some users have been tripped up by difficulties related to the install program, the Summer 87 version of Clipper and memory shortages. The company classifies these headaches as relatively minor but has taken steps to deal with them.

According to Larry Heimendinger, Nantucket's president and chief executive officer, an updated release of the Clipper 5.0 master disk will contain changes designed to provide more room to run programs. It will be provided free to current users when ready.

Users stymied by an installation problem with Clipper 5.0 generally have one of two problems: They are either trying to run it under DOS 4.01, or they do not have enough memory, Heimendinger said. However, at least one user running DOS 3.3

said he had great difficulty trying to install Clipper 5.0.

In any case, Heimendinger claimed that Clipper 5.0 is installing "100% OK in all cases." What is happening, he said, is that during the installation process, the utility program is not compiling correctly.

"It's a bug in DOS 4.01" that results in the creation of a larger-than-normal program when running the compile and link utilities, Heimendinger said. In response, Nantucket has changed "what has to come into memory in the install and compile portion" of the program so that some of it can be swapped out of memory. This fix is being tested and will be made available free of charge shortly, he said.

New users will be alerted

through a note in the package. "If they still have problems, we'll provide help for free," Heimendinger said.

Nantucket provides 30 days of free support, starting with the first call. The firm has also released a technical bulletin on the install problem that advises users what to do about it. It can be downloaded from Compuserve.

Clipper 5.0 users who still have Summer 87 installed can run into a conflict in the set parameter that sends the compiler to Summer 87 libraries instead of Clipper 5.0 libraries. Users will get an error message. A fix requires a simple change in the set parameter.

A third issue involves memory in general. Some users are finding that they exhaust the

swap space available under virtual memory management, Heimendinger said.

"It's not a bug. The system is performing exactly as it should. The problem is that virtual memory system needs a certain amount of RAM to maintain pointers to virtual memory space," Heimendinger explained. What is happening is that users, "through a number of different and very dynamic circumstances, are putting the squeeze on memory and so running out of the actual memory they need to continue."

"We're going to give users more head room on the [master disk]," Heimendinger said. Meanwhile, Nantucket has put out a second bulletin telling users what not to do.

## Type-talking is a Gallaudet favorite

For the school's deaf students, E-mail and a PC network open new vistas

### ON SITE

BY MAURA J. HARRINGTON  
CW STAFF

WASHINGTON, D.C. — While most college students pick up the phone to call their friends to find out about this week's party or the latest gossip on campus, the students at Gallaudet University run not to the phone, but to the nearest networked personal computer.

Why? Because most of the students at Gallaudet are deaf.

Gallaudet University, chartered by Congress in 1864, is the only university in the U.S. completely devoted to educating the deaf. Though computers have been a part of the educational system at Gallaudet for several years, the use of computers as a learning tool for the deaf has increased dramatically in the past few years, according to Kevin Casey, director of Gallaudet's computer services department.

The computer system at Gallaudet consists of 1,000 IBM and compatible personal computers and 200 Apple Computer, Inc. Macintoshes, including SE and IICX models. The PCs are

networked together with both thick Ethernet and fiber-optic cabling on a Digital Equipment Corp. Decnet network. The Decnet implementation includes a Vaxcluster with two 8650s and two 11/785 VAXs. The most popular software running on the network is Wordperfect Version 5.1, said John Millikin, director of user services for Gallaudet's computer services department. But there are several other off-the-shelf packages in use, including Lotus Development Corp.'s 1-2-3 and Ashton-Tate Corp.'s Dbase IV, that run off of the network server. Access to Macintosh-based applications is available through Macintosh-to-VAX third-party software, he said.

Some of the ways in which Gallaudet's computer services department has helped to ramp up use of its PCs is by creating a wide variety of training and educational programs that apply to

real-life work situations and that require the use of computers.

For example, the university uses closed-captioned videotaped training courses from Minneapolis-based Learn-PC, designed to provide deaf students with hands-on training, a Learn-



Gallaudet officials (from left) Millikin, Casey and Herbold run popular campus network

PC spokeswoman said. Otherwise, these students would be forced to watch a translator for instruction first and practice later, she said.

Another project going on at Gallaudet that prepares students for "real-life" work situations is

a Minitel USA, Inc. telecommunications system that incorporates video capabilities that allow deaf work-study students to make conference calls and establish ongoing links between students, faculty and the university's corporate sponsors participating in the work-study project.

The Gallaudet University Speech Training and Evaluation System, or GUSTES, is also a student speech training program that uses a specially designed NEC Technologies, Inc. PC-compatible computer that features a board said to allow acquisition and rapid conditioning of multiple voice signals and to provide an array of special sensors to interpret a deaf speaker's voice, according to an article written by Dr. James Mahshie, professor and director of the laboratory.

Unlike other voice interpretation devices, GUSTES uses signals obtained from a variety of sensors that can interpret the actual speech articulation of the voice and minute variations in air pressure that are associated with speech production.

While there are several innovative projects going on at Gallaudet, the most popular computer feature to date among the approximately 2,000 students at Gallaudet is electronic mail.

### Mail call

More than 1,000 students log on to DEC's Vaxnotes every day, and many log on at least three times per day, sending three to five messages in each session, estimated Robert Herbold, assistant director of computer services. Vaxnotes, Bitnet and Internet are the most popular E-mail services available on the university's network, but users can also use any standard Transmission Control Protocol/Internet Protocol-compatible E-mail package as well, he said.

Because Internet and Bitnet, two nationwide university and research bulletin board services, provide access to networks located in other colleges throughout the world, students can also take classes at other universities that are not offered at Gallaudet.

Because of the increased popularity of PCs during the past two years, the computer services department has set up several computer centers across campus, locating some in the dormitories, he added. Students can remotely log in to the network, he said.



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# Agilis stalls workstation, targets wireless LANs

BY JIM NASH  
CW STAFF

Months after introducing its portable, wireless local-area network, Agilis Corp. is halting production of its workstations and fighting off a lawsuit launched by three ex-employees who developed Agilis' wireless technology.

Ken Biba, president of Mountain View, Calif.-based Agilis, said stiff competition in the portable market has forced the company to focus exclusively on its spread-spectrum radio LAN connections for portables. At his last count, said Gib Hoxie, an analyst at Arthur D. Little, Inc. in Los Angeles, there were 77 companies making portables.

About 300 of the Agilis workstations, mostly aimed at the high-end military and industrial markets, have been purchased to date, Biba said. About 80% of the workstations have the wireless connections, he said. The radio connections were developed by four men who joined Agilis in 1988 to further their spread-spectrum work.

Analyst Andrew Seybold at Dataquest, Inc. in San Jose, Calif., attributed the Agilis move to the large amount of capital required for portable computer production. He said the company has a better chance of making a name for itself early on in the wireless LAN connection market.

"The product was meeting a cool reception in the marketplace," Hoxie said. "It was too big, too heavy and too expensive. I thought they were off base technologically. The most interesting thing about their workstation was that it was wireless."

"Their workstation was a me-too product, and then it went wireless," Seybold said. Agilis' wireless connections form 230K bit/sec. bridges on any LAN running Ethernet. As many as 100 workstations can be hooked up using the connectors. Their range is 100 meters indoors and a kilometer outdoors.

Agilis' networks support all Ethernet-based systems, Biba said. The company began making wireless network connections 18 months ago, after it picked up a development team from Princeton, N.J., consultancy PA Technology. The team included PA Technology President Peter Cripps and executives Greg Nease, Mike Plotnick and Bill Frezza. They had been seeking funds to build a wireless LAN for Apple Computer, Inc.'s LocalTalk connector.

In joining Agilis, the team gave the technology's patent rights to Agilis and received a grant-back agreement allowing them to develop other, noncompeting

wireless network products in the future.

Cripps, Plotnick and Frezza split off from Agilis in December 1989, Plotnick said, to form T/BD Associates in Princeton. Nease has remained with Agilis. T/BD is developing its own desktop wireless LAN products.

Shortly after joining the company, Plotnick said he thought wireless LAN connections would be the most profitable line for Agilis. Plotnick, who left Agilis in December to start his own spread-spectrum technology firm, filed suit against the company this summer in connection with a noncompetition agreement he signed with Agilis.

"The market wants a rugged workstation," but in a multiplicity of different designs rather than Agilis' standard modular architecture, Plotnick said. Police cars demand a more stationary workstation than "someone repairing a 747 or an Oldsmobile, who would carry it."

T/BD is avoiding head-to-head competition with Agilis by developing wireless desktop products, he explained, and by working with spread spectrum as well as low-power AM/FM broadcasts. The devices will be introduced during the next 12 to 18 months, Plotnick said.

The lawsuit was filed to cement his company's right to develop and market desktop wireless LAN connections, Plotnick said. Biba said he is "mystified" by T/BD's lawsuit.



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### MICRO BITS

## AST wraps Bravo PC in upgrades

**AST Research, Inc.** is celebrating its 10th anniversary by bundling more than \$1,200 worth of free upgrades with its Bravo/386SX personal computer. Until Dec. 31, the promotion will include a 16-MHz 386SX system with a 5¼-in. floppy drive, 40M-byte hard drive, 2M bytes of memory, IBM Video Graphics Array adapter, AST-VGA color monitor, **Microsoft Corp.**'s Windows 3.0, DOS 3.3 and a Microsoft serial mouse with pad. Valued at \$3,900, the package costs \$2,795. According to AST, the Bravo/386SX itself normally retails for \$2,845.

In return for completing a market research questionnaire, **Aldus Corp.** will provide image-setter service bureaus and color prepress houses that service and support its products with a free copy of Aldus Preprint. The offer is good through Dec. 31. For more information about Aldus Preprint, call Aldus customer relations at (206) 628-2320.





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## Fitzgerald

CONTINUED FROM PAGE 39

look at this conso . . . oops, almost said consortium. IBM is adamant that the MCDA is an association, not a consortium.

Anyway, it's easy to look at this group as a sign that IBM is admitting, after 3½ years of living in UK-like splendid isolation, that it's time to get some help before EISA vendors storm the Channel. Most analysts think that this effort by IBM will be too little, too late, even if IBM decides to loosen licensing requirements and share information about MCA products before it brings them to market.

Further, they point to the nature of

the group and note that almost half of the executive committee — Intel, Chips & Technologies, AOX, Core International, Western Digital and Cumulus — are chip makers, board makers and a hard drive vendor, who'll support anything that might make them money. The rest of the committee consists of three also-ran PC makers (Apricot, NCR and Olivetti), one company with an identity crisis (Siemens Nixdorf), a test lab (National Software Testing Lab), a company that doesn't even make MCA machines (NEC Technologies) and a company that almost no one has ever heard of (Reply Corp.). In other words, out of the supposed 800 vendors of MCA products, IBM has assembled a cast of self-serving opportunists, clowns and Europeans (and who here

cares how well MCA does in Europe, really?) to go into battle against the vendors that support the EISA standard.

Nonetheless, the timing of the group — indeed, its mere existence — may sway corporate purchases from EISA to Micro Channel.

EISA has been, essentially, marketing at its finest. While most analysts say that EISA has already established itself as an alternate standard to MCA, actual sales figures show that EISA is not making a splash in the market (189,000 machines worldwide this year, about 1/10th of total MCA sales), and projections indicate that the new architecture needs at least two years to begin to challenge MCA in the marketplace. So while EISA products do exist, the bus has yet to

establish itself in the market. That means EISA vendors are vulnerable right now, despite the marketing hype.

Marketing hype is key in this case, because the Gang of Nine, the EISA consortium, has based its attack on MCA around the incompatibility between MCA and the existing Industry Standard Architecture (ISA) that will dominate the installed base of personal computers until Armageddon or thereabouts. This incompatibility means that ISA boards won't run in MCA machines. As my college writing professor used to say after all my breathy sentences, "So what?"

Think about it: Just how likely is it that your average power-eating user with an expensive, brand-new, 32-bit, I486-based, loaded-for-bear EISA machine will take a board from a clunky old 8-bit or 16-bit ISA machine and pop it into the power box?

If card compatibility ain't marketing hype, may Madison Avenue sink beneath the surface of the earth.

The MCDA is (if IBM is smart) the first step in a marketing counterattack by IBM that will make buyers who are projected to replace their ISA machines with EISA machines think more than twice before they do so.

IBM is going to have to make it worthwhile for other vendors to join the MCDA and at least give the appearance of being influenced by what MCDA members have to say about MCA, or it runs the risk of having the acronym stand for Machines Containing Dumb Architecture. But if IBM plays its cards right, EISA vendors may start to play a different hand than they have been, one that might even include MCA.

For now, let's hope that the MCDA leads to some truly innovative boards for MCA, something that's lacking right now (not that EISA has them, either). Then, maybe users will start to care about the issue in the near future, rather than four or five years down the line. That would make the coming onslaught of marketing and countermarketing all worthwhile.

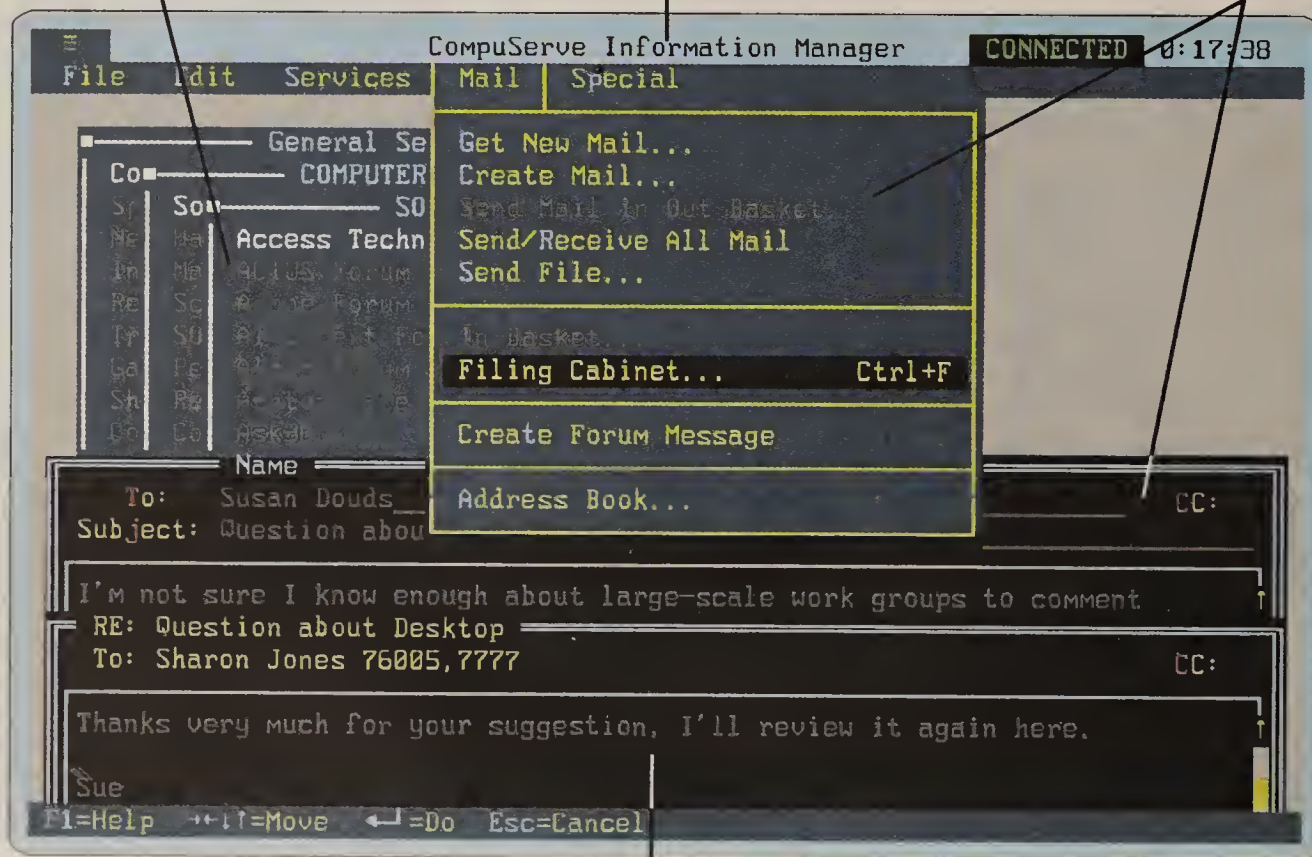
Fitzgerald is a *Computerworld* Midwest bureau correspondent.

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800 848-8199

Requirements for MS-DOS version of CompuServe: Hayes compatible modem and 640K RAM. Hard drive recommended.  
\*Suggested retail price.

## ALR weds CPU to Micro Channel

Advanced Logic Research, Inc. earlier this month melded its trademark upgradable CPU technology with IBM's Micro Channel Architecture (MCA) bus. Upgradable systems based on the Extended Industry Standard Architecture bus have been available from ALR and others for more than a year.

Users can upgrade the CPU of the MCA-equipped Modular Processor System from an Intel Corp. 33-MHz 80386 to a 25- or 33-MHz Intel I486.

"This is a major advantage for customers that are planning for more local processing capability in the future but don't want to pay a premium today," said Aaron Goldberg, an analyst at International Data Corp. in Framingham, Mass.

The entry-level system with 386 processor, 1M byte of memory and no hard disk sells for \$1,995. At the upper end, a 33-MHz 486-based unit with a 330M-byte hard disk costs \$7,595.





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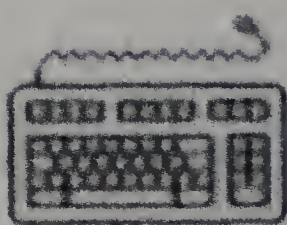
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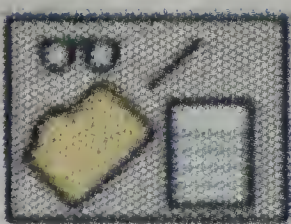
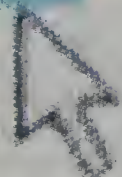
Users can even enjoy a network connection and at the very same time satisfy the cravings of multiple applications.



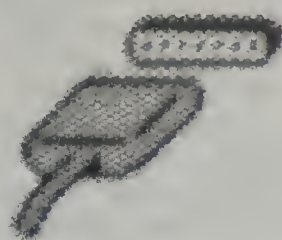
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## I486

FROM PAGE 39

cache at any given time — vary widely. Caches work best when they can be optimized for very specific applications.

Unfortunately, most caches sold with off-the-shelf PCs are multipurpose caches, according to Porter. "That kind of cache you can't really optimize for a specific application," and consequently, the hit rate will not be as high, he said.

The most common cache controllers feature capacities of about 4K bytes, but larger

caches of 4M or 6M bytes are available. But these can be problematic, according to Kirkey. "You can run into various software compatibility issues when you start putting these esoteric controllers in there," he said.

A rarer strategy to boost disk access is the disk array. Only a handful of companies offer arrays on I486-based PCs, including Compaq Computer Corp. and Dell Computer Corp. With arrays, several drives are stacked and data is striped across the disks in set patterns. One or more of the drives act as a mirror backup to ensure data integrity and fault tolerance.

While arrays do speed access in some cases, access may sometimes actually be slowed, according to Porter. "Arrays won't necessarily speed up seeks; some have slower access than individual drives, depending on the application," Porter said. Also, it takes longer to stripe the data on an array than it does to write data to individual drives, he said.

**Better seek times**

With or without caches and arrays, hard disk drives in general have improved their average seek times considerably, making them better-suited partners for the I486 CPU.

"For a time, disks lagged behind processors," Zagaeski said. "Now, disks have caught up to processors" in their relative speed, he said.

Porter pointed out that a 20M-byte hard drive on an IBM PC AT once offered an average total access time of about 50 msec. Today, a 300M-byte drive on a I486-based PC can retrieve data at less than half that rate.

Displays have also been a potential bottleneck in I486 systems. However, designers have worked around it by using separate controller cards containing random-access memory or a separate video coprocessor.

Common in the Apple Computer, Inc. Macintosh line and now coming to the PC world, separate video coprocessors remove the heavy graphical data processing burden from the central processor. The video coprocessors help speed things up by handling all the complex calculations involved in displaying graphics.

Another option is separate memory for graphics. "Video RAM provides pages into which video data [such as pixel coordinates] can be temporarily stored so that the central processor can go off and do something else," Zagaeski said.

## NEW PRODUCTS

**Systems**

Wyse Technology has announced a terminal that uses X Window System server code X.11 R4 and a 32-bit Motorola, Inc. 68020 microprocessor.

The WY-X5 is equipped with a 17-in., flat noninterlaced monochrome display. Features include 1,280- by 1,024-pixel resolution and a 70-Hz flicker-free refresh rate.

The product is priced at \$1,799.

**Wyse Technology**  
3471 N. First St.  
San Jose, Calif. 95134  
(408) 473-1200

Visual Technology, Inc. has introduced the X-14/ES Display Station, a small footprint networked X graphic display terminal that complies with the X/Open Consortium Ltd.'s X11R4-X server specification.

The unit includes a Motorola, Inc. 68000 processor running at 12 MHz, 1M byte of standard random-access memory and a 14-in. landscape display with

1,024- by 800-pixel resolution.

Pricing starts at \$995, and volume shipments are scheduled to begin next month.

**Visual Technology**  
120 Flanders Road  
Westboro, Mass. 01581  
(508) 836-4400

**Software applications packages**

Integrated Software Design, Inc. has introduced a personal computer-based software package that integrates graphic design, information management and printing functions for in-house production of labels, forms and signs.

Barney Ellis enables users to prioritize, queue and batch jobs to achieve unattended printing, and up to four printers can be used for separate jobs, the vendor said.

The product is priced at \$1,695.

**Integrated Software Design**  
171 Forbes Blvd.  
Mansfield, Mass. 02048  
(508) 339-4928

Designcad, Inc. has announced a microcomputer-based computer-aided design (CAD) program that describes geometric entities via a single, unified parametric representation.

Designcad Macintosh's single parametric representation serves as a cubic spline, and its extension serves as a bicubic surface. It enables users of Apple Computer, Inc.'s Macintosh to change mesh resolution without redrawing, the vendor said.

The product also provides two- and three-dimensional CAD capabilities and complete dimension/annotation capabilities.

Designcad Macintosh is priced at \$699.

**Designcad**  
327 S. Mill St.  
Pryor, Okla. 74361  
(918) 825-4848

Business Forecast Systems, Inc. has released a product that can automatically forecast hundreds or thousands of items.

Forecast Pro Batch Version was designed to interface with corporate databases and production planning systems. Features include exception reports and a built-in forecast evaluation option that automatically withholds data from the end of each series and checks the forecasts against actual values.

The product runs on IBM Personal Computer ATs, XTs, Personal System/2s or compatibles and is available at a special introductory price of \$1,995 until Jan. 1, 1991.

**Business Forecast Systems**  
68 Leonard St.  
Belmont, Mass. 02178  
(617) 484-5050

Bradford Information Systems has announced an application designed to conserve fuel during an oil crisis.

The Interactive Distribution Planning System (IDPS) application enables users to create optimal truck routes from central distribution locations to customer delivery points.

The product runs on IBM Personal Computer ATs, XTs, Personal System/2s and IBM RISC System/6000 workstations that provide multiuser ac-

cess under Unix-based AIX operating systems.

It is priced from \$5,000 to \$7,500 and includes two days of installation and training.

**Bradford Information Systems**  
2819 Foster Lane  
Austin, Texas 78757  
(512) 459-8999

**Software utilities**

Trend Micro Devices has introduced a laptop-to-desktop and desktop-to-desktop file transfer utility that features file transfer rates of 500K bit/sec. and includes an antivirus scanning system designed to detect and protect against viruses during file transfer operations.

Pcopy uses a virus scan program and a virus pattern bank to examine files before they are transferred. The product is available in 3½- and 5¼-in. formats and is priced at \$119.

**Trend Micro Devices**  
2421 W. 205th St.  
Torrance, Calif. 90501  
(800) 228-5651

Blueridge Technologies, Inc. has announced a software package designed to convert an Apple Computer, Inc. Macintosh system and a scanner into a stand-alone document imaging system.

The Optix Desktop Imaging System enables users to scan paper documents into a Macintosh system and store them on an optical disc or magnetic disk. The system can do CCITT Group IV image compressions or decompressions in software instead of hardware, the vendor said.

The product runs on any Macintosh II machine and is priced at \$495.

**Blueridge Technologies**  
P.O. Box 430  
Flint Hill, Va. 22627  
(703) 675-3015

**Data storage**

Priam Systems Corp. has announced a line of 200M-byte 3½-in. disk drives equipped with an adapter card for Intel Corp. 80286-, 80386- or I486-based IBM Personal Computer ATs and compatibles.

The ID200L series consists of the IDL200L-IC (\$1,551), ID200L-IF (\$1,531) and ID200L-I (\$1,500). Features include a 15 msec seek time and 50,000 hours of mean time between failures, according to the vendor. The drives are compatible with systems operating under DOS, Xenix, Unix or OS/2 and provide maximum bus speeds of 16 MHz.

**Priam Systems**  
1140 Ringwood Court  
San Jose, Calif. 95131  
(408) 954-8680

Mountain Network Solutions, Inc. has announced a mini-cartridge tape subsystem that incorporates an integrated device electronics embedded IBM Personal Computer AT interface.

The Filesafe 8500 can accommodate up to 304M bytes in a 3½-in. half-height form factor while maintaining a data throughput rate of up to 10M byte/min., according to the vendor.

Evaluation units are scheduled to be available in January, and production quantities are slated to be released this March. The product has a retail price of \$895.

**Mountain Network**  
240 Hacienda Ave.  
Campbell, Calif. 95008  
(408) 379-4300

**Board-level devices**

Pacific Data Products, Inc. has announced Pacific 4 Memory, an upgradable memory board that enables users to expand the memory of Hewlett-Packard Co.'s Laserjet printers.

The memory board can be used to expand the 512K-byte printer memory of the HP Laserjet IIP or Laserjet III devices by a range of 1M to 4M bytes. The product also enables users to print 300 dot/in. graphics and scanned images.

Pricing ranges from \$199 to \$499, depending on the amount of memory selected.

**Pacific Data Products**  
9125 Rehco Road  
San Diego, Calif. 92121  
(619) 552-0880

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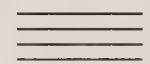


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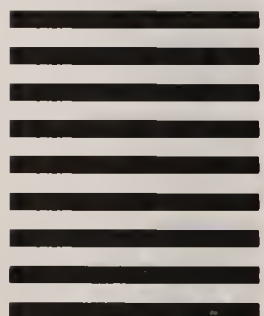
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## COMMENTARY

Ellis Booker

### Not a flash in the pan



Remember The Flash? He's recently made a comeback, starting in his own special-effects-jammed prime-time TV show. And how appropriate: The Flash, one of my favorite superheroes, is the ideal icon of the '90s, an age of quick-response, just-in-time instantaneousness.

Along with double cappuccino, what makes all this hyperactivity possible, of course, are computer and information technologies: on-line transaction processing, local-area networks, electronic mail and the ubiquitous facsimile machine.

Unfortunately, a new class of high-speed applications, particularly those calling for wide-area distributed networking and remote access to digitized images, threatens to outrace the nation's long-distance and local telephone networks.

Flash. Onto the scene bursts a public network technology you will hear much more about in the coming year or two: Switched Multimegabit Data Service (SMDS).

SMDS is a packet-switched networking specification for connecting LANs, host computers, image databases and so on over metropolitan areas. IEEE stan-

*Continued on page 62*

## Netview options multiply

*Netview/PC users take their time about moving to direct interfaces*

BY ELISABETH HORWITT  
CW STAFF

WHITE PLAINS, N.Y. — Now that IBM has finally provided users with not one, but two alternatives to Netview/PC, users are starting to think creatively about how best to implement Netview as a multivendor network management system.

IBM announced the long-awaited direct LU6.2 link to Netview last September. The vendor has also made it clear that it will support the Open Systems Interconnect Network Management Forum's specifications as a way for non-IBM

networking devices and network management systems to communicate with Netview.

Contrary to what analysts once predicted, however, the existence of direct links to Netview are unlikely to spell the demise of Netview/PC. IBM Vice-President Ellen Hancock emphasized during the announcement that the vendor will continue to support Netview/PC as a separate but equal alternative to the other interfaces.

More importantly, Netview/PC — in particular, the more powerful OS/2 version — has been finding its way into a significant number of user sites,

including Aetna Life and Casualty Co., Union Pacific Railroad and General Electric Corp. Automated Network Management, Inc., an IBM business partner that sells Netview/PC applications and development tools, reports approximately 20 installations.

Nor do present Netview/PC users express an urgent need to migrate to the more direct interfaces. "There is no particular advantage for us right now to migrate to LU6.2 or OSI," said Jim Montequin, a senior manager of data communications at Union Pacific Railroad. The railroad, with the help of IBM business

partner Diederich & Associates, developed Netview/PC applications to link Netview to a variety of non-Systems Network Architecture devices, including a radio communications network that controls trains through Tandem Computer, Inc. hosts, he added.

GE, an early user of the OS/2 version of Netview/PC, has found the interface more than adequate to support Netview monitoring of various telecommunications devices, according to Kevin Huff, a program manager who headed the Netview/PC implementation project.

On the other hand, IBM shops are likely to start looking at the LU6.2 link as they move toward more sophisticated network management applications that require program-to-program communications. GE initially de-

*Continued on page 59*

## NSF opens up digital doors to scientific data

BY GARY H. ANTHERS  
CW STAFF

WASHINGTON, D.C. — One million Internet users in 35 countries now have on-line access to information about research programs funded by the National Science Foundation (NSF).

The NSF is joining the U.S. Department of Energy, the National Aeronautics and Space Administration, the National Institutes of Health and other agencies in a move to make information about federally funded research available free to the

public via electronic bulletin boards and databases.

Officials at the NSF said the data will be used by individual researchers, the offices of NSF-sponsored research, science policy analysts and the press.

NSF's Science and Technology Information System (STIS) can be accessed by dial-up connection or by remote log-in via Internet, the umbrella network of networks used mostly by the research and academic communities. STIS contains the full text of the latest two "NSF Bulletins" — the monthly publication announcing new programs,

deadlines for upcoming grant awards, publications, meetings and sources for more detailed information. It also contains press releases and lists of publications and films and will soon contain a database of descriptions of 15,000 to 18,000 active NSF-awarded research projects.

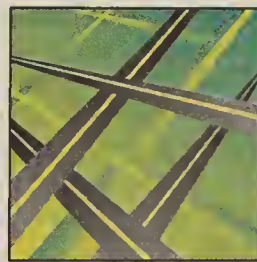
Users may interactively search text of documents by keyword, topic or by Boolean expression, displaying results on-line or downloading documents to a local device. Internet users get files from NSF using the File Transfer Protocol.

Ruta Godwin, project leader in NSF's Office of Information Systems, said that until now, information about NSF programs

and grants was available by calling the foundation's office of public affairs or through the Dialog commercial on-line service. The information is now available faster, more conveniently and at no cost other than a possible long-distance telephone charge, she said.

Godwin also said information is now more easily obtainable by those with a limited knowledge of what they are seeking. The retrieval software, Verity, Inc.'s Topic, uses a concept-based retrieval method that automatically relates topics and subtopics. For example, Godwin said, a user specifying an interest in "materials science" would also retrieve information

*Continued on page 59*



**Who created  
these products  
to fit virtually  
any environment,  
be it UNIX- or  
MS-DOS-based?**

**Here's a hint:  
It's not IBM.**



# SNA gateways survive adolescence

BY JOANIE M. WEXLER  
CW STAFF

They've come a long way, baby.

According to test results in a recent report by J2 Software Labs, Inc. in Santa Cruz, Calif., Systems Network Architecture (SNA) gateways are increasingly feature-rich and reliable, making life in the micro-to-mainframe environment much less painful than in days of yore.

"When SNA gateways came out five years ago, there were concerns about sessions staying active, file transfer failures and communications checks," explained John Siegel, president of J2 Software and author of the report. "The products have really matured in the last couple of years."

SNA is IBM's suite of networking protocols that allows communications between IBM devices and between IBM and non-IBM devices. A hardware adapter inside each desktop computer or a stand-alone gate-

way is necessary to convert the protocols in the small systems to SNA so they can communicate with the SNA-speaking mainframes.

J2 Software, which evaluated nine SNA MS-DOS-based gateway products during a period of approximately one year (see chart), cited the stand-alone approach as generally the most economical for serving multiple desktops. However, companies using this approach for local-area networks must balance trade-offs in performance — because of data-traffic bottlenecks accumulating in the single device — with the overhead added to the mainframe by direct connections, according to Siegel.

J2 Software's gateway study used an unweighted rating system that resulted in only a 10-point differential between the highest and lowest rated vendors. Out of a possible 81 points, the highest rating of 57 was shared by Attachmate Corp. and Data Interface Systems Corp.

The lowest rating (47) was given to 3Com Corp.

Siegel pointed out, though, that most companies would weigh certain categories more

heavily than others (J2 Software treated all criteria as equal), rendering certain products more applicable to different environments.

The study provides a ratings worksheet, which an organization can use to fine-tune J2 Software's assessment to suit its own needs.

ware's assessment to suit its own needs.

Siegel added that the study will probably be updated later this year to rank the Microsoft Corp. Windows support now offered by many vendors in their SNA gateway products.

## Golden gates

SNA gateways from Attachmate and Digital Interface Systems tallied the highest raw scores in product comparison

J2 product ratings by category	3Com Corp. Maxess SNA GW	Attachmate Corp. Extra! 3270 GW	Data Interface Systems Corp. DI 3270 LAN GW	Digital Communications, Inc. Irma LAN GW	Eicon Technology Corp. Access GW	IBM Personal Comm 3270	Network Software Associates, Inc. Adapt SNA GW	Novell Inc. Netware SNA GW	Rabbit Software Corp. Rabbigate GW
Comprehensiveness	2	7	8	7	3	8	4	8	8
Pricing	6	2	9	5	7	1	8	7	7
Gateway-to-host access features	7	8	8	4	4	5	4	3	6
Manageability and security	7	7	7	8	4	6	6	4	3
Terminal emulation	3	7	6	8	6	8	4	6	6
Printer support	7	6	3	7	8	7	7	5	8
API support	5	5	5	6	7	8	7	8	6
Memory usage and file transfer speed	4	8	5	5	5	5	3	7	5
Ease of use	6	7	6	5	4	5	6	4	7
UNWEIGHTED TOTAL	47	57	57	55	48	53	49	53	56

Rating system: 1-Unacceptable 5-Average 9-Excellent

Source: J2 Software Labs, Inc.

CW Chart: Doreen St. John

# Low-cost Macs gain network access

BY JAMES DALY  
CW STAFF

While the low price tag of Apple Computer, Inc.'s Macintosh Classic was the star of last week's product introductions, the networking abilities of the newly released Macintosh IISI may go a long way in helping realize an even more important company objective: cracking the corporate market.

With the SI, Apple now has a machine costing only \$3,769 that can be easily tied into sophisticated corporate networks. The key to the equation is tucked deep inside the SI with the Nubus expansion slot, an op-

tion previously only available on more expensive Macintoshes.

The slot allows users to install the \$249 Nubus adapter card, a sophisticated device that supports multiple processors and expands the SI's ability to tap into large communications networks. The Macintosh IISI also includes a slot to install the 030 Direct Slot card, which also beefs up the system's networking options.

Analysts said the move builds on Apple's strategy to integrate sophisticated communications abilities into its lower-priced machines. "Apple has made tremendous strides in positioning the Macintosh, which once was

perceived as a stand-alone device, as a workstation that offers a high level of connectivity," said Lee Doyle, an analyst at International Data Corp. (IDC) in Framingham, Mass.

Networking capabilities have become more important to Apple as the number of Macintoshes linked into networks has skyrocketed, product manager Brodie Keast said. IDC estimated that nearly half of all Macintoshes are networked, and 1.2 million Appletalk nodes will be installed worldwide by 1993.

Apple has moved to take advantage of this dynamic. Last year, Apple introduced 17 networking and communications products, and this spring, the Cupertino, Calif.-based firm made good on a longstanding promise to provide connectivity tools to hook Macintoshes into the Digital Equipment Corp. VAX environment.

The company, however, had been slow out of the gate to provide connectivity products, and third-party developers quickly gobbled up a good part of the market share.

However, Apple said it is committed to correcting former mistakes, specifically toward providing more competitive Ethernet connectivity options. With third-party developers undercutting Apple's \$699 Ethernet card by a wide margin, Apple scientists are reportedly working on a new low-cost Ethernet product. Apple is also reportedly developing a line of lower-cost Ethernet adapters for the Macintosh that could sell for less than \$300.

# Novell manager warns of problems by phone

BY JIM NASH  
CW STAFF

Novell, Inc. is giving network monitors a voice through its Lantern Services Manager. The software, currently being beta-tested and scheduled for shipment in January, promises to call information systems managers when statistical thresholds are exceeded on a network.

"This is interesting," said Tom Thibault of Thibault Associates, Inc. "You can sit this on a network, hook up a modem on it, and it will dial up the administrator" to warn of problems, he said. Thibault Associates is a network management services company in Walnut Creek, Calif.

While he has yet to see the Services Manager application, Greg Scott, computing services manager at Oregon State University's school of business, said he has been impressed with Novell's Lantern monitors.

"Lantern really does a better job pulling apart packets to see what the problem is," Scott said. Services Manager would need to do a better job isolating failures than the Hewlett-Packard Co. LAN Probe he uses to monitor his systems, he said. "I want to be able to tell in feet where a cable failure is, for example," he said.

Jeff Turner, product manager at Novell, Inc.'s San Jose, Calif., office, said Services Manager software continuously monitors and logs the activity recorded by

all Lantern devices on multiple local-area networks. Turner said that a modem-equipped Services Manager personal computer will automatically dial up Lantern stations if a cable failure occurs between machines.

The Lantern can monitor any device running any protocol on an Ethernet network, he said. While Lantern uses Simple Network Management Protocol (SNMP) to communicate with Services Manager, no SNMP agent is needed on the monitored machines, Turner added.

"What they've found here is their niche," Thibault said of Novell's Lanalyzer LAN analysis unit. "This is aimed at users who want something that does what the Lanalyzer and [Network General Corp.'s] Sniffer will do for a multiple-LAN environment, but with a limited IS staff."

Thibault also said a service firm such as his might use the device remotely to track events on a client's LAN. By setting the warning thresholds low enough, he said, it would be possible to get an alert from Services Manager before the user knew a problem was building.

Lantern Services Manager runs on Intel Corp. 80386- and 1486-based PCs running Microsoft Corp.'s Windows Version 3.0 and will be priced at \$4,995. The application does not require Novell's Netware. Lantern monitors began shipping in May, Novell said, and cost \$4,495.

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# Boston users batten hatches for Big Dig

*Redundant communications links are order of the day as eight-year highway project looms*

BY SALLY CUSACK  
CW STAFF

BOSTON — In 1998, Boston will (it hopes) have completed its multibillion-dollar central artery project. Plans call for 128 miles of highway to run across the city's congested downtown business district and its thick tangle of communication cables.

But just what will happen to telecommunications during the eight-year construction project termed "The Big Dig" by locals?

Jim Allen, vice-president of communications at the Federal Reserve Bank of Boston, said his biggest concern will be driving to work across the construction. "We've taken care of the communications lines," he said confidently.

The Federal Reserve currently has four redundant lines of fiber-optic cable and two different carriers responsible for maintaining uptime during construction.

"No single construction accident will

**W**ITH MORE than 17 million calls every day that cross the path of the artery, the carriers have been working round-the-clock for the past several years to insure that lines will be operational.

take out all of our facilities," Allen said, noting that the bank started working with both New England Telephone (NET) and Metropolitan Fiber Systems/McCourt, Inc. early in 1989, and the work was completed by the end of the year.

The Federal Reserve has been using one fiber line from NET since 1987, and the diversity offered with the automatic switching was basically an enhancement, Allen said. The bank will use the MFS/McCourt network for incoming 800 services and for accessing its long-distance carrier in mid-December. MFS/McCourt is providing two paths for communications to and from the Federal Reserve, with network routes entering the building at separate points and housed in separate conduits.

With more than 17 million calls every day that cross the path of the artery, the carriers have been working round-the-clock for the past several years to ensure that lines will be operational during the massive construction project.

According to John Johnson, a spokesman for NET, the local Nynex carrier, the company has divided the area into two parts in order to reroute the facilities. The first area concentrates on the inter-office circuits responsible for switching offices in the downtown area, he said, indicating that there are literally hundreds of cables intersecting the artery in this area. The other portion consists of the local loop piece of the network, which connects a user with the telephone switching office.

"The local loop portion cannot be moved," Johnson said. "There are 39

conflict locations across the artery construction."

To circumvent this potentially disastrous situation, NET has constructed utility corridors — conduits located in underground infrastructures that house the cables away from construction activities. The company will switch the local loop from the security of these conduits before construction begins, Johnson said, adding that NET has a backup fiber loop in addition to the alternative loop structure.

According to Massachusetts Depart-

ment of Public Works director Robert Albee, the pencil-thin fiber-optic technology allows for the elimination of "a lot of unnecessary cable. We're working with almost 100 years worth of utility companies' infrastructure here, and *none* of it is state of the art."

Not everyone is as optimistic as Allen or Albee. Debra Villani, systems manager at Hemenway & Barnes, a large legal firm, said, "We're right on State Street, overlooking the artery. If they cut a cable, the whole area could be out."

Villani noted that the law firm is not totally dependent on the telephones to conduct business, and "if we *had* to do without them for a couple of days, there are alternatives."

She added that she would like to see a more detailed explanation of the error margin from the state Department of Public Works.

According to Shelly Karp, operations analyst at the New England Medical Center, the hospital is watching the situation and has several auxiliary backup systems and uninterruptible power supply devices to carry it through a potential power cut. The 400-bed facility depends on several different computer vendors to supply its systems, including IBM, Digital Equipment Corp. and Data General Corp.



**"That reminds me, now that we've managed to network everything, who's going to manage our network?"**

Deciding on how to manage a network with different devices, systems and architectures can be an abstract proposition for any company.

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# Netview

CONTINUED FROM PAGE 53

cided not to implement a two-way "command-response" connection on Netview/PC, primarily because "it would be too big a programming investment," Huff said.

"Now, if LU6.2 reduced costs and made it easier to do this," and if the right vendors supported it, "we would be very interested," he said.

CSX has "already automated a significant portion of our operations" using Netview applications, said Doug Underhill, the railway carrier's assistant vice-president of technical services. LU6.2 would provide a way to extend those automation

operations by allowing distributed automation system managers to communicate with one another, he said.

Underhill said that he also liked the fact that a Netview program can ask a device to explain an unfamiliar message over the LU6.2 link. In contrast, Netview/PC requires "having to stop everything while you explain to Netview what a new modem status code means," he added. "Periodic interruptions go against the idea of automated operations." CSX currently does not use Netview/PC.

Another potential use for LU6.2 would be to support communications between Netview hosts at CSX's two data centers, "so that if something goes wrong at one

**N**ETVIEW'S OSI network management interface will take longer to reach user sites, because vendors have yet to implement the OSI Network Management Forum specifications.

site, one Netview would tell the other and more people could act on the problem," Underhill said.

So far, vendor support has been thin for IBM's LU6.2 interface to Netview. Automated Network Management, Inc., a San Juan Capistrano, Calif., third-party Netview/PC application developer, intends to support OSI links to Netview, but not LU6.2, a company spokesman said.

Netview's OSI network management interface will take longer to reach user sites, because vendors, including IBM, have yet to implement the OSI Network Management Forum specifications that will ensure interoperability.

However, users that anticipate using Netview to monitor a wide variety of non-IBM networking systems may decide to wait for the OSI link. Mervyn's, for example, would prefer to use OSI rather than LU6.2 to link Netview to T1 multiplexers and other non-IBM systems, "because when OSI is finally ready, vendors will support it, not LU6.2," said Jim Williams, the department store chain's telecommunications manager.

Demand for OSI and LU6.2 links to Netview will get a boost when IBM makes the network management system available on OS/400 and OS/2 systems, according to David Passmore, a partner at Ernst & Young in Fairfax, Va. IBM quietly announced last month that Netview and OSI network management protocols would be available on OS/400 in September of next year and on OS/2 in March of next year. The smaller Netview "hosts" are likely to act as local managers for a specific location or network subsystem, such as a local-area network, sources said.

Linking up to these smaller Netview systems will not require Netview/PC, Passmore said, because that interface was designed specifically to translate messages into the Network Management Vector Transport protocol used by IBM mainframes.

## NSF

CONTINUED FROM PAGE 53

on 10 logical subtopics — such as ceramics and polymers — previously defined by NSF.

Topic also allows the assignment of weights so that subtopics — which can be nested to any number of levels — thought to be most relevant will pop up first in inquiries.

STIS runs on a Sun Microsystems, Inc. 386I Unix workstation at NSF headquarters here, and it can support 10 simultaneous users at 9.6K bit/sec., according to Godwin. She said 200M to 300M bytes of data will be on-line within a year. The workstation connects to an Internet gateway on a local-area network at NSF headquarters.

The National Institutes of Health set up its own on-line retrieval system, called NIH Grant Line, in July. The free service, also accessible via dial-up or Internet, has 1,500 registered users and contains information about NIH announcements, meeting notices and requests for grant applications. For information, call (301) 496-7554.

Similar information from the Department of Energy, the National Aeronautics and Space Administration, the Office of Naval Research and the Federal Aviation Administration is available from the Federal Information Exchange. Its 1,200 users must currently dial in directly, but a connection to Internet is in the works, a spokesman said.

enhanced, making it easier than ever to use, monitor problem alerts, and "talk" with IBM and non-IBM systems.

Of course, there are other attractive features of NetView to consider.

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# Booker

FROM PAGE 53

dard 802.6 initially provides for T3 (45M bit/sec.) and T1 (1.5M bit/sec.) access, moving to support for the international Sonet specification of 150M bit/sec. in the future.

But will SMDS, which looks so wonderful on paper, break users' hearts, much as the Integrated Services Digital Network (ISDN) has? The answer is no, but more on that in a moment.

Earlier this month at Interop '90 in San Jose, Calif., Bellcore sketched out a three-tiered implementation plan for SMDS:

- Phase One (1990-1991): Establish SMDS service "presence" over the next 12 to 15 months.
- Phase Two (1992-1994): Based on Bellcore generic requirements, additional capabilities — including various network management features — will be added to the service. Interchange and local exchange companies cooperate to provide early nationwide service.
- Phase Three (late 1994 and beyond): Expand SMDS capabilities to accommodate higher speed broadband access (150M bit/sec.). Local broadband switches and tandem switches

arrive to connect these local SMDS switches within and across LATA boundaries.

Two days earlier, in Chicago, AT&T Network Systems said it had developed a high-speed, fast-packet switch to support SMDS. The BNS-200 Broadband Networking Family is already being tested by Bell-south, Nynex, Pacific Bell and Southwestern Bell in their

SMDS trials, said AT&T, which hopes to make the switch generally available in the third quarter of 1992.

Why will customers and carriers rush to SMDS over ISDN? First, there's the market reality. Data services, which only account for 5% of all public network traffic, are nevertheless a growth area for carriers; moreover, data services are predomi-

nantly sold to business customers, a key market for carriers.

Meanwhile, many of those corporate telecommunications customers have despaired about the slow deployment of ISDN for years. Ubiquitous ISDN, if it ever arrives, will make terrific sense for telemarketing operations (thanks to features like automatic number identification), but it is not opti-

mized for data transport, these users say.

In other words, while ISDN evolved naturally from analog voice telephony, SMDS, like the LANs, supercomputers and image workstations it will interconnect, has its roots in data networking.

Booker is *Computerworld's* Chicago bureau chief.

BIT BLAST

## LAN services bundled

AT&T is beckoning the growing number of companies needing to link local-area networks over a wide area with a repositioning of its data service offerings. AT&T has bundled services such as its Accunet T1.5, Switched Digital Services, Packet Services and Customer Controlled Reconfiguration into what its sales force will tout as a LAN-interconnect "solution."

The carrier plans to sell services from the package primarily to companies with infrequent LAN-to-LAN traffic; switched services are often more economical for such companies in that they pay for bandwidth only when they use it.

Digital Equipment Corp. has decided to change the name of Lanworks rather than risk delaying shipments of the personal computer integration product while it engages in a lengthy legal battle, the company said. A Maryland-based company called Lanworks, Inc. challenged DEC, and a federal judge has issued a preliminary injunction against DEC's use of the name in several states, a DEC spokesman said. The first Lanworks product began shipping on time last month; a new name has yet to be chosen.



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Network Software Associates, Inc. and Future Soft Engineering, Inc. have developed a connectivity software package designed for IBM Personal Sys-

tem/2s and compatibles running Microsoft Corp.'s Windows 3.0 or Hewlett-Packard Co.'s New Wave.

Dynacomm/Elite provides multisession IBM 3270 Personal Computer-to-host connectivity and LU6.2 advanced program-to-program communications. A

stand-alone version with 3270 features will be available next month for \$495.

**Network Software**  
**39 Argonaut**  
**Laguna Hills, Calif. 92656**  
**(714) 768-4013**

Dataviz, Inc. has announced Version 4.5 of Maclinkplus/Wang VS and Maclinkplus/Wang OIS connectivity software packages.

The products support transfers of Wang Laboratories, Inc. Wang Integrated Image System images from Apple Computer, Inc. Macintosh machines to Wang VS systems. Maclinkplus/Wang VS costs \$395, and Maclinkplus/Wang OIS costs \$495.

**Dataviz**  
**35 Corporate Drive**  
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**(203) 268-0030**

Packet/PC, Inc. has announced Packet/Flash, a bit compression software package designed to reduce the response time of communications done by users of IBM Systems Network Architecture-based 3270 machines and personal computer users who dial into an X.25 packet network.

The package uses Packet/3270 emulation software to provide quick access to electronic mail and transaction processing applications.

Packet/Flash began beta testing in August and is scheduled to be released this month. It reportedly will cost \$6,000 for the mainframe component and \$75 per PC for the first 50 copies.

**Packet/PC**  
**270 Farmington Ave.**  
**Farmington, Conn. 06032**  
**(203) 678-1961**

**Local-area networking hardware**

Hayes Microcomputer Products, Inc. has announced Hayes for LANs, a family of Ethernet local-area network adapters designed for IBM Personal Computer ATs, XTs, Personal System/2s or compatibles.

The line includes Ethermate 8 (\$249), an 8-bit half-card designed for thick or thin Ethernet cables; Ethermate 8UTP (\$329), an 8-bit half-card that supports thick and unshielded twisted pair (UTP) Ethernet cables; and Ethermate Trio 16 (\$349), a 16-bit board that supports thick, thin or UTP Ethernet cables.

Ethermate 8 is already available, and Ethermate 8UTP is slated to ship this month. Ethermate Trio 16 is scheduled for availability in mid-November.

**Hayes**  
**P.O. Box 105203**  
**Atlanta, Ga. 30348**  
**(404) 449-8791**

Intellicom, Inc. has announced the Quick-Net 3000 Plus series of 10M bit/sec. 10BaseT-based local-area networking wiring concentrator/repeaters, network interface adapters and transceivers.

The Model 212 wiring concentrator (\$999) can be used to regenerate received signals for broadcast to attached host computing devices and concentrators. The Model 401 transceiver (\$129) allows a coaxial access unit interface 15-pin-based network adapter card to be interfaced with a 10BaseT concentrator.

The Tpair-8T (\$325) and Tpair-16T (\$449) network adapters include a built-in access unit interface connector that supports connections to coaxial Ethernet networks.

**Intellicom**  
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## EXECUTIVE TRACK



**Thomas H. Dega** has been named assistant director of the Internal Revenue Service's Martinsburg Computer Center in Martinsburg, W. Va.

The center is the federal income tax record-keeping center of the IRS, maintaining and updating individual and business tax returns on magnetic tape.

Dega had been director of the office of input processing for information systems development since 1987. He was appointed to his current position after completing the IRS executive selection and development program.

Dega became director of the office of electronic filing in Washington, D.C., in 1986. Before that, he held IRS positions in Detroit, Kansas City, Mo., and Andover, Mass. He began his IRS career in 1964 as a tax technician in Milwaukee.

He holds a bachelor's degree in economics from the University of Wisconsin at Milwaukee and a certificate in public administration from Syracuse University.

**Rex Schemerhorn** was named manager of IS in the production control and systems department of Diamond-Star Motors Corp. in Normal, Ill.

Diamond-Star Motors is an automotive joint venture that is 50% owned by Chrysler Corp. and Mitsubishi Motors Corp.

Schemerhorn was previously assistant manager of IS. He joined Diamond-Star in 1987.

### Who's on the go?

Changing jobs? Promoting an assistant? Your peers want to know who is coming and going, and *Computerworld* wants to help by mentioning any IS job changes in Executive Track. When you have news about staff changes, be sure to drop a note and photo or have your public relations department write to Clinton Wilder, Senior Editor, Management, *Computerworld*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701-9171.

## More than skin deep

*Values come before IS technology at personal care products maker The Body Shop*

BY CLINTON WILDER  
CW STAFF

**W**hen a visiting journalist is the only person at corporate headquarters wearing a necktie, you know that a company is different. And The Body Shop, Inc. decidedly is.

The fast-growing personal care products company is a place where all paper, including computer printouts, is either recycled or shredded into packing material to stuff mail-order cartons. Sweatshirts and sneakers are standard business dress, opposition to animal testing and rain forest destruction are stated corporate goals, and dynamic company founder Anita Roddick has appeared on the cover of *Inc.* magazine with the weighty introduction, "This woman has changed business forever."

In this unique corporate culture, information technology plays a critical role in warehousing, distribution, order processing and other typical retail functions. Systems manager Rick Hellar is responsible for enhancing The Body Shop's business with technology — but not at the expense of The Body Shop's mission.

"First and foremost are the values," Hellar says. "With technology, there are certain things we don't do. We don't use bar codes on the product labels, for example; that would deface them. That's just not appropriate to our philosophy and the way our customers view us."

The same philosophy also rules out electronic mail and automated call answering; the company insists on human interaction. "Technology is not the driving force here," Hellar adds. "We have a deliberate strategy to use technology as an enhancement."



Joyce Ravid

**Hellar** has his hands full keeping up with The Body Shop's growth plans

Hellar and his company are far from computer technology Luddites, however. Hellar, a former senior systems analyst at Carter Hawley Hale Stores, Inc. and consultant at Coopers & Lybrand, waxes as enthusiastically about his new IBM RISC System/6000 as any hard-core techie. The Unix-based minicomputer will replace an NCR Corp. Tower that The Body Shop's information needs have outgrown.

For Hellar and his staff of one — Karen Mueller, manager of the network of 32 Apple Computer, Inc. Macintoshes — keeping up with The Body Shop's information demands is no

small matter. The UK-based company's plan for growth in the U.S. is truly staggering.

There are about 25 retail stores in the U.S. now, with 40 expected to be opened by the end of the year. Plans call for 50 to 60 new stores in each of the next two years, by which time The Body Shop will have a major product-mixing, bottling and packaging operation running at its U.S. headquarters building in Cedar Knolls, N.J. Worldwide sales, from 450 stores in 37 countries, are about \$150 million.

"The biggest part of my job is deal-  
*Continued on page 68*

## Taking the fast track to decentralization

BY CLINTON WILDER  
CW STAFF

**I**f information systems management on Wall Street is life in the fast lane, Charles H. Mayer fits right in.

After less than one month as the new chief information officer and managing director at First Boston Corp., Mayer is already working on an IS decentralization plan. Although the management details are still being worked out, Mayer wants to have individual IS groups assigned to fixed income securities, equity trading, investment banking and corporate support. Under the current structure, all systems development is centrally coordinated.

"We'd like to set up groups with

more product orientation," Mayer said in a recent interview at his midtown Manhattan office. "We could have four CIOs, one for each group."

The goal of the plan is a familiar one for IS in the '90s — getting those who understand the business closer to the development of systems for gaining advantage in the business. Mayer said he believes that competitive advantage comes more from identifying the right market needs than from choosing the latest technology.

"It sounds great to use buzzwords like neural networks and artificial intelligence, and many [financial firms] have tried them," he said. "But

very few have produced bottom-line results. What you need is the ability to respond quickly to market opportunities; technology is still a tool."

Mayer, 43, has spent about 20 years in IS on Wall Street and developed Morgan Stanley Group, Inc.'s Trade Analysis and Processing System.

Mayer's commitment to empowering business units with decentralized IS is more than lip service. "If you do it right, there is less need for a strong central technologist," he said.

"Maybe the right thing to happen is that I work myself out of a job in three to five years. That would be a success for me."



**First Boston's  
Mayer**



## Skin deep

FROM PAGE 67

ing with growth," says the 31-year-old Hellar. "If you come back in a couple of years, you won't even recognize us."

Ironically, although The Body Shop emphasizes human values, it embodies many characteristics of the Information Age firm that

are trumpeted by management gurus. It is fast-paced, flexible and managed with a minimum of bureaucracy. In many ways, it is an IS manager's dream.

"At other companies, a [senior executive's] open door policy means the door is open if you make an appointment three weeks in advance," Hellar says. "Here, it is really open, and that's very unique, very condu-

cive to new ideas. It's a very entrepreneurial atmosphere with a lot of room to suggest and come up with solutions."

One new idea, enabled by information technology, is Homebase, which allows homebound residents to work as part-time Body Shop mail-order takers. Although the current technologies are telephones and facsimile machines, Hellar plans to provide

on-line terminals in the future.

It's not an act of charity; The Body Shop needs the people to staff its fast-growing mail-order business, which handles 3,500 calls per week. "We can't get employees in here fast enough," says Janine Newcombe, the firm's inventory and marketing coordinator.

Most strategic business applications, such as sales modeling

and pricing structures, are done on the Apple Computer, Inc. Macintosh. One of The Body Shop's important competitive differentiators is giving customers information about its unusual products, which range from Moroccan mud shampoo to Japanese washing grains to Chinese rice-bran body scrub. Product information manuals are published with the Macintosh using Aldus Corp.'s Pagemaker — on recycled paper, of course.

Another project, scheduled to go live this month, calls for franchise store owners to place their weekly orders with Telxon Corp. handheld terminals instead of fax machines. Hellar says he expects

**T**ECHNOLOGY IS NOT the driving force here. We have a deliberate strategy to use technology as an enhancement."

RICK HELLAR  
THE BODY SHOP

the plan to improve the speed and accuracy of supplying up to 200 items per store per week.

Perhaps most telling of all, the estimated \$80,000 project wasn't in Hellar's original IS budget. "If a project makes sense and will enhance the business, it will get funded," he says.

Because of the ambitious growth plans, Hellar says, IS funding has to be based on "what makes sense long-term." In the mail-order department, Hellar could have saved money and met today's needs with an Intel Corp. 80286-based system, but he went with an Intel 80386-based system because he knows it will be needed soon enough. "It's different around here from one day to the next," he says.

An environment of encouraging new approaches to business makes technology a logical fit in many ways, despite its potential conflicts with the organization's philosophy, Hellar says. "People here are used to change, so new technology is easy to implement."

"I've never worked for a company quite like this," Hellar adds, telling the story of how The Body Shop opened a soap factory in Glasgow, Scotland, because unemployment there was running as high as 40%. One-quarter of the profits generated in that operation go into a trust fund for the city. Every retail store around the world is expected to run at least one project for community benefit.

"I go home at night feeling good about my job and about the company," Hellar says. "Those are the principles that I have to be careful about treading on with technology."

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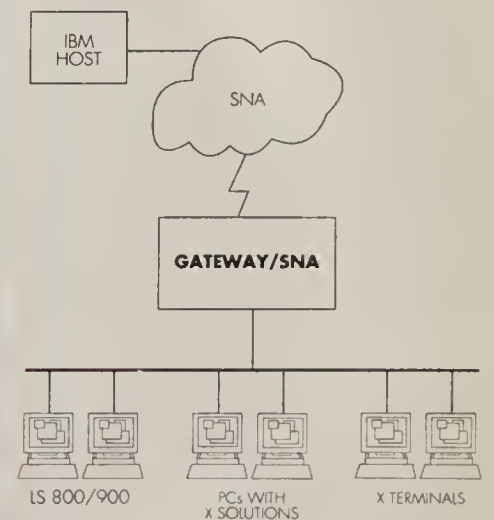
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## BOOK REVIEW

## High time for the dawning of New Age IS management

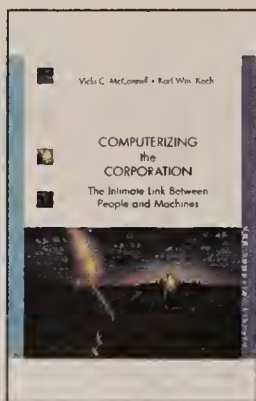
### COMPUTERIZING THE CORPORATION

By Vicki C. McConnell and Karl Koch  
Van Nostrand Reinhold, \$32.95

It is up to New Age management techniques to make information technology more useful to companies. Or so argue the authors of *Computerizing the Corporation*, in a readable, useful book that chal-

lenges top corporate management to forget its preconceptions about the value of technology and consider carefully the true impact a new system has on a company's operation.

*Computerizing the Corporation* is centered on the belief that "problems of computerization and automation are management problems, not technical problems." The authors make several serious, though subjective, charges. For instance, they believe that management has created a fantasy world of what information technology can do for a company. As an extension of this fantasy world, McConnell and



Koch say they believe that most organizations treat computers as though they were living things, looking at them to solve problems that the authors consider purely human.

The authors also charge that most companies work to integrate human and technical systems, rather than treating the technical system as a tool to improve the way workers work. In other words, by paying more attention to the technology's potential than how a particular company operates, corporations have, by and large, adopted entirely mistaken approaches to computerizing.

That's a strong statement, and while it is difficult to refute, given, for instance, *Computerworld's* own surveys that repeatedly show user dissatisfaction with systems, there is little statistical evidence in the book to back it up.

McConnell and Koch do sprinkle a number of case studies, both successes and failures, throughout the book, which provide solid illustrations of their points. One such example cites a "Midwestern farm equipment manufacturing company" that implemented an on-line inventory control system. The company, though, failed to train the personnel assigned to the system in basic computer use. Even worse, the IS staff interacted poorly with users. As a result, the inventory control system was not fully live for 10 months after its original deadline and cost the company \$750,000 more than it originally expected.

The book, which strongly urges that systems are not implemented at the expense of employees but rather to help them grow, ends up reading a bit like a touchy-feely approach to management. Yet punches are not pulled, and in fact corporations are rather soundly pummeled.

For example, in the case of the farm equipment company, the authors point out that the workers could not be blamed for the cost overruns and delays, because the new system represented a new way of working — one that made the workers feel stupid, not skilled. McConnell and Koch say "the typical management response has been that the workers will get used to the new system and will eventually learn how to use it . . . The responsibility for the transfer of new technology to the worker rests with senior management."

#### Solutions, too

Management frequently gets hit with such shots, as the authors strive to introduce basic human reactions to change into the equation of automating. But the book does not just bash management — it does offer solutions to the issue of automating. The salve comes from exhaustive lists of recommendations for implementing either new systems or replacing old ones.

There is, despite the focus on employees, a strong belief that information technology can be used to offer a company a competitive advantage. But the authors feel that it is a trap to believe that just computerizing will make a company better. Instead, they say that companies must use technology to make employees work better. For those that fail to do so, the authors warn, "bankruptcy will become easier every year."

It should thus be no surprise that communication among and between human beings is the ultimate focus of this book. The authors pound away at this theme, encouraging extensive information gathering and careful thought to developing and implementing a system to guarantee that users will "own" the system and, therefore, put it to work. They also challenge IS departments to keep the lines of communication open with other departments.

There is certainly enough reality in *Computerizing the Corporation* to make the New Information Age sound like it got here just in time.

MICHAEL FITZGERALD

Fitzgerald is a *Computerworld* Midwest bureau correspondent.

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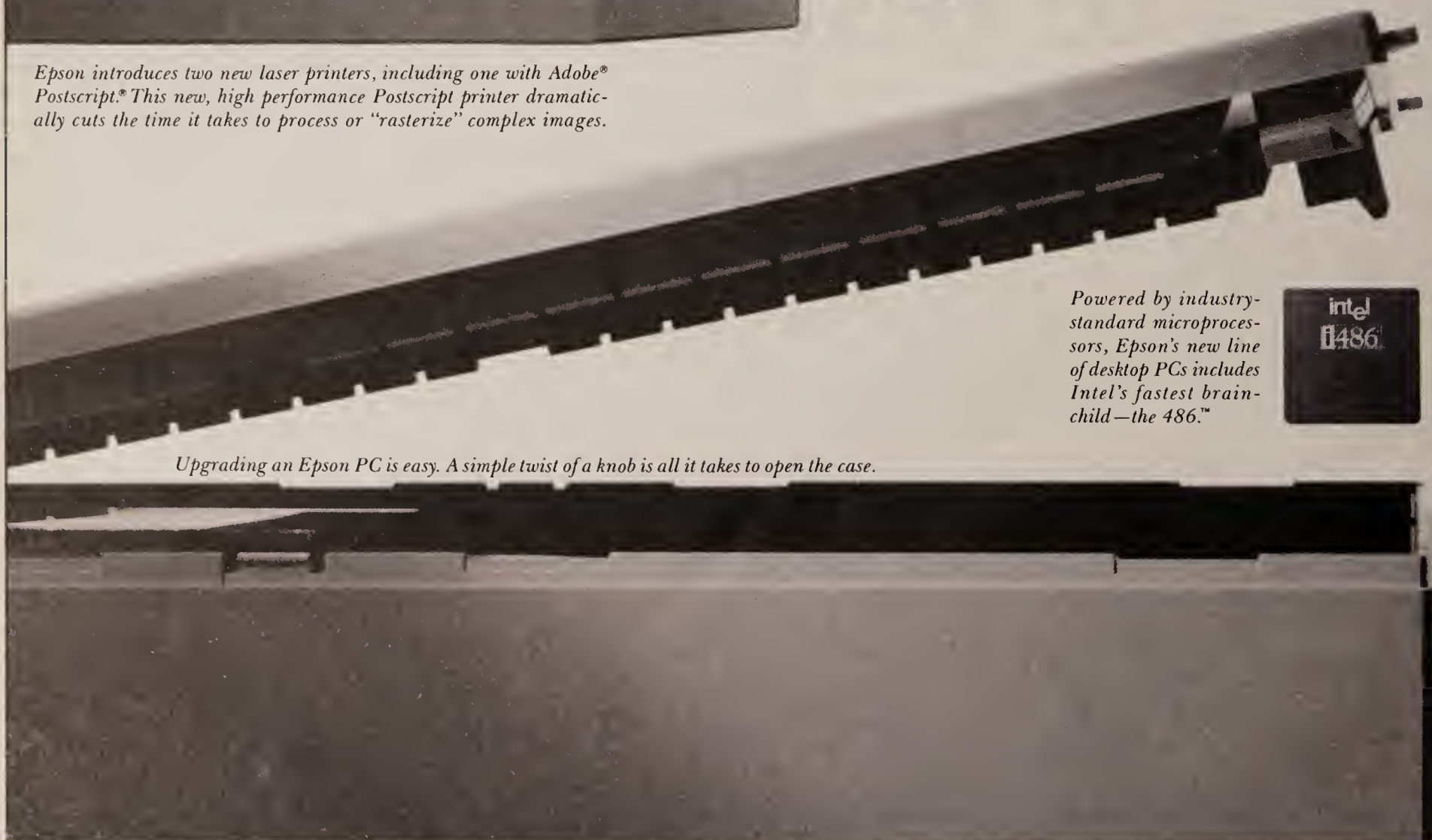
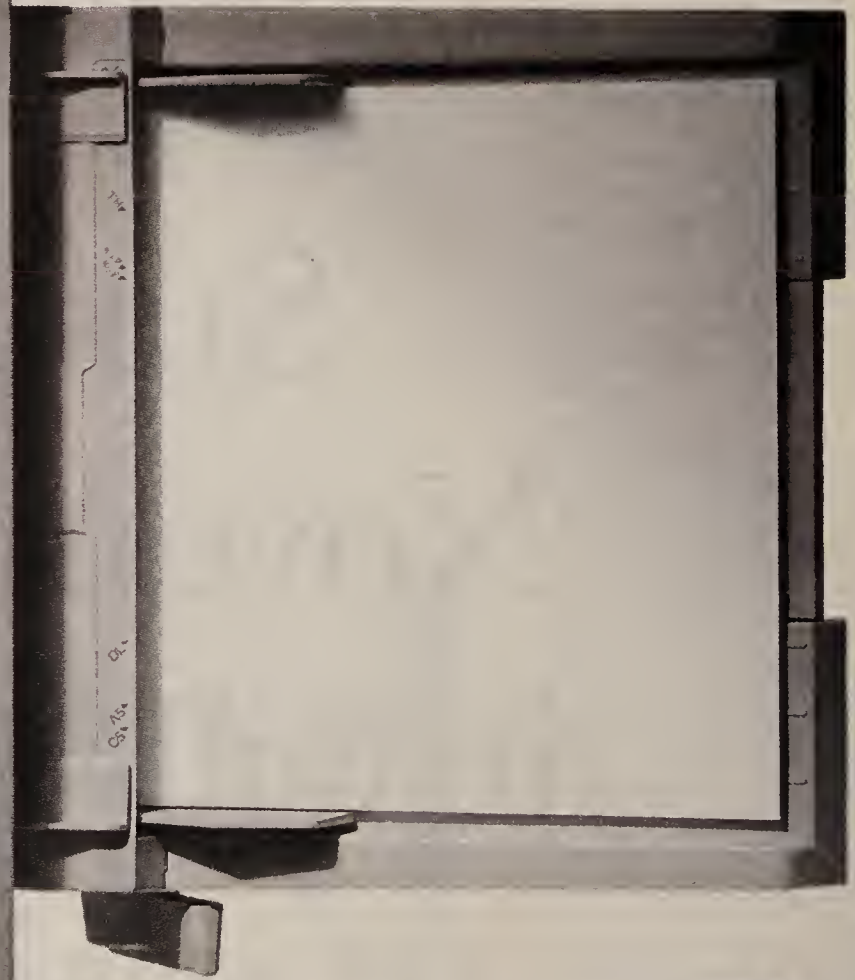
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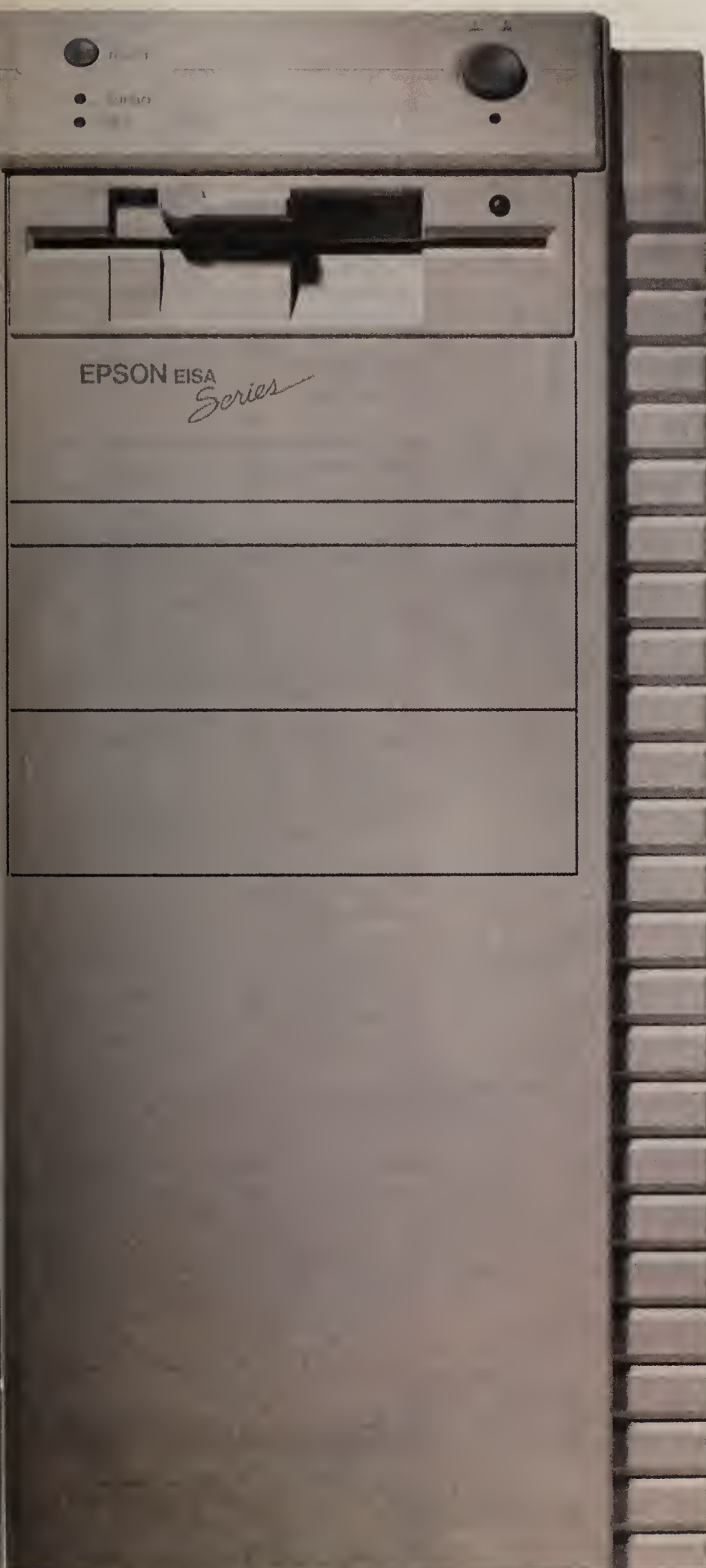


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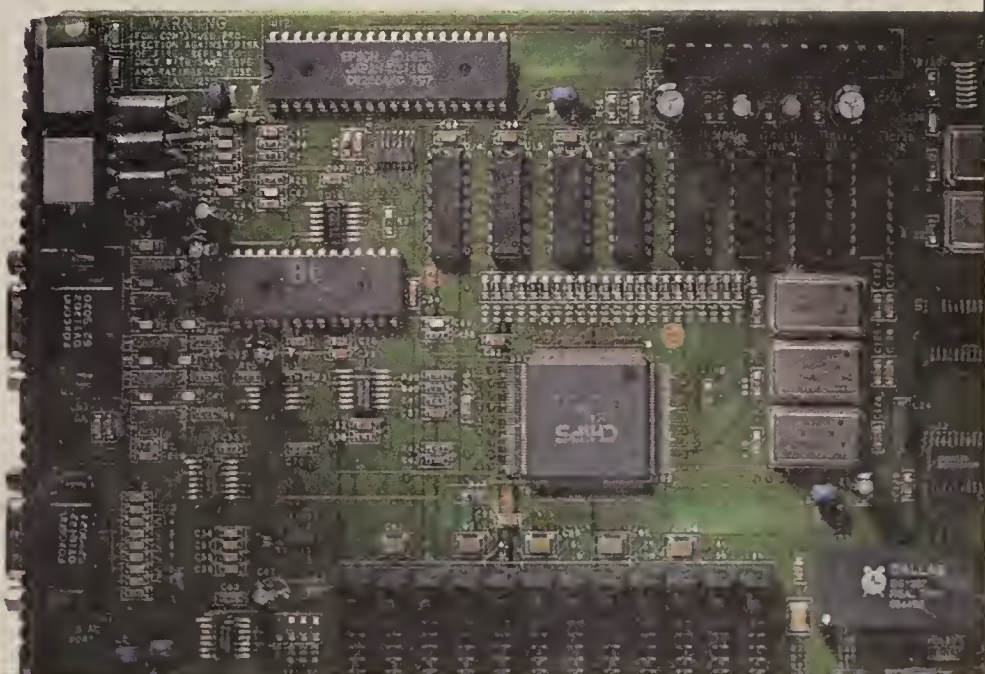
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## C A L E N D A R

The 2nd National EDI Systems Conference & Exhibit will take place Dec. 3-5 at the Washington, D.C., Hilton & Towers. The conference includes more than 40 concurrent session presentations by electronic data interchange users and consultants, as well as vendor exhibits. Keynote speakers from the user community are Robert Ferkenhoff of Sears, Roebuck and Co., Max Hopper of American Airlines and Carol B. Hallett, commissioner of the U.S. Customs Service.

More information is available from the The Electronic Data Interchange Association, Alexandria, Va. (703) 838-8042.

## NOV. 4 - 10

**Adopso Management Conference.** Phoenix, Nov. 4-7 — Contact: Adopso Education Department, Arlington, Va. (703) 284-5355.

**Guide 78.** Atlanta, Nov. 4-9 — Contact: Guide, Chicago, Ill. (312) 644-6610.

**XPLOR Electronic Document Printing Professionals International Conference.** Nashville, Tenn., Nov. 4-9 — Contact: XPLOR International, Palos Verdes, Calif. (800) 669-7567.

**Decision Support and Executive Information Systems: A Managerial Perspective.** Cambridge, Mass., Nov. 5-6 — Contact: Decision Support Technology, Boston, Mass. (617) 482-3596.

ton, Mass. (617) 482-3596.

**Successful Implementation of Imaging Technology.** Boston, Nov. 5-6 — Contact: KPMG Peat Marwick, Executive Education Registrar, Montvale, N.J. (800) 762-3932.

**Synoptics Communications Users Group Meeting.** Santa Clara, Calif., Nov. 5-6 — Contact: Amparo Lago, Synoptics, Mountain View, Calif. (415) 691-7174.

**CASE: The Next Generation.** Washington, D.C., Nov. 5-7 — Contact: Digital Consulting, Andover, Mass. (508) 470-3880.

**ISDN Week.** London, Nov. 5-9 — Contact: IGI Europe, London, England (011) 41 61 6915111

**Association for Computing Machinery Conference.** Arlington, Va., Nov. 6-7 — Contact: Jim Adams, ACM, New York, N.Y. (212) 869-7440.

**Nonprofit '90 Conference.** Atlanta, Nov. 6-7 — Contact: Barbara Ackerly, Inforum, Atlanta, Ga. (404) 220-2640.

**Messaging '90.** New York, Nov. 6-8 — Contact: Information Publishing Corp., Houston, Texas (713) 974-6637.

**Digital Dealers Association Annual Meeting.** Tucson, Ariz., Nov. 6-9 — Contact: DDA Administrative Office, Chelsea, Mich. (313) 475-8333.

**Understanding IBM's Operations and Systems Management Strategy.** Chicago, Nov. 7 — Contact: New Science Associates, Southport, Conn. (203) 259-1661.

**Computer, Office Systems & Services Conference.** Houston, Nov. 7-8 — Contact: Show America Management, Houston, Texas (713) 890-0397.

**Consulting: Building IS Partnerships.** Cambridge, Mass., Nov. 7-9 — Contact: Jay Delaune, Index Group, Cambridge, Mass. (617) 499-1373.

**Design Engineering Show and Conference.** Atlanta, Nov. 7-9 — Contact: Design/South, Stamford, Conn. (203) 964-0000.

**GE Information Services Business Communications Users Group Meeting.** Orlando, Fla., Nov. 7-9 — Contact: Wendy Herman, GE Information Services, Rockville, Md. (301) 340-4977.

**GIS/LIS.** Anaheim, Calif., Nov. 7-10 — Contact: GIS/LIS, Bethesda, Md. (301) 493-0200.

**Expo Comm Chino '90.** Beijing, China, Nov. 8-13 — Contact: Ron Akins, Krause & Associates, Bethesda, Md. (301) 986-7800.

**Southeastern Smoli College Computing Conference.** Hickory, N.C., Nov. 9-10 — Contact: Dr. Frank Cheatham, Campbellsville College, Campbellsville, Ky. (502) 465-8158.

## NOV. 11 - 17

**Share 75.5.** Fort Worth, Texas, Nov. 11-14 — Contact: Share, Chicago, Ill. (312) 644-6610.

**Computer-Conado First.** Toronto, Nov. 12-14 — Contact: U.S. Department of Commerce, Office of Canada, Washington, D.C. (202) 377-3718.

**Autofact '90.** Detroit, Nov. 12-15 — Contact: SME, Dearborn, Mich. (313) 271-0777.

**Comdex/Fall '90.** Las Vegas, Nov. 12-16 — Contact: The Interface Group, Needham, Mass. (617) 449-6600.

**Supercomputing '90.** New York, Nov. 12-16 — Contact: Malvin Kalos, Cornell Theory Center, Cornell University, Ithaca, N.Y. (607) 255-7157.

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
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## UNIX ON THE DESKTOP

### The grass is getting greener

BY WILLIAM BRANDEL

**I**n January 1990, Peter Messina did more than just hang a new calendar on the wall of his New York office. The first vice-president of corporate telecommunications at Royal Alliance Associates, a brokerage and insurance firm, was informed that the company had been acquired by the Sunamerica family of companies.

While most acquisitions present headaches for information systems managers, this one was a migraine. Messina's group was informed that it had three months to completely revamp its computing structure — everything from the mainframe to its IBM Personal Computers.

At the time, all of Messina's users — 112 customer service and money market representatives — were using AT&T 6539 split-screen terminals. More than 40 of them used PCs for word processing and spreadsheet applications. All told, users were dealing with 17 different software packages and were connected to an IBM 3090 mainframe, an IBM 4300 minicomputer and a Digital Equipment Corp. VAX 6310.

With time running out in April, Messina tried accommodating haste with simplification and sold Royal Alliance management on a centralized desktop concept — based on Unix.

"They said, 'Fine. You have two weeks,'" Messina says.

During the next weekend, Messina got rid of the IBM and Compaq Computer Corp. PCs and installed a Sun Microsystems, Inc. 390 file server running University of California at Berkeley Unix 4.2 to support the AT&T 6500 terminals.

He centralized his users and gave them access to the same word processing and spreadsheet applications in Unix versions of the popular DOS products that a third of them had already been using.

The fact that these commercial DOS applications were available under Unix was the real key to a smooth and rapid transition, according to Messina.

"With split-screen terminals,

we were able to give all the brokers access to the same applications," Messina says. "And with Lotus [1-2-3] and Wordperfect available on Unix, I didn't need the 40 or so PCs anymore. At the same time, everyone who didn't have a PC was able to use it on their terminal. As far as what users saw on the screen, they

able to them. The major DOS applications have made the Unix transfer, including Lotus Development Corp.'s 1-2-3 spreadsheet, Microsoft Corp.'s Microsoft Word, Wordperfect Corp.'s Wordperfect word processing package, Autodesk, Inc.'s AutoCAD, Ashton-Tate Corp.'s Dbase, Borland International's Paradox and Informix Corp.'s Wingz, just to name a few.



John & Wendy

didn't see anything different."

But what was under the hood was very different indeed, including faster processing, more robust networking and scalability.

"This system gives us more horsepower than we could have ever tried to achieve with a PC LAN," he says, "and not even near the cost."

The Royal Alliance situation represents a landmark for Unix. No longer do hardware vendors such as Sun have to tell customers that the most popular commercial applications are unavail-

able to them. And no longer do Unix advocates have an excuse for not making it in Fortune 1,000 firms — on the desktop, anyway.

"Pretty much all the personal productivity stuff that you would want on Unix is out there," according to James Knowles, a systems analyst at Salomon Brothers in New York. "Once you have a Lotus spreadsheet, a Wordperfect and a database like Borland's Paradox, you're there. The rest tends to be targeted by industry — and that's stuff a big corporation usually develops internally, anyway."

"We are still predominantly a DOS shop and are just sticking our noses into the Unix tent," says Peter Patterson, senior computer systems analyst for end-user support at the World Bank in New York. "But as we are getting more of our users over to Unix, I must say that I am pleased with the number of DOS applications that have crossed over and the speed that they are getting there."

According to analysts and vendors, if Unix ever had a chance to penetrate the desktop, its time is now. OS/2, once the DOS heir apparent, has failed to dominate that territory. Europe, where Unix has established a stronger user base than in the U.S., presents a booming business environment.

Closer to home, the allure of U.S. government contracts are pulling commercial DOS vendors into Unix development. Orem, Utah-based Wordperfect first cracked the Unix market in March 1988 to run on government-owned NCR Corp. Tower systems. Today, Wordperfect is ported to more than a dozen flavors of Unix and has more developers working on Unix than OS/2, Apple Computer, Inc. and DEC's VMS operating system.

Other developers are following suit. "We now have a special marketing branch in Washington, D.C., that is dedicated to bidding on government projects," says Chris Wraight, manager of Unix product marketing at Lotus in Cambridge, Mass.

"It wasn't like a General Motors or Ford came to us and said, 'I've got to have 1,000 copies of 1-2-3 on Unix,'" Wraight says. "It was more like a Ford coming to us and saying, 'I'm one of your largest PC customers, and I have a large population of engineers running Sun workstations or others, and they need a good office automation suite.'"

A second reason developers are looking into Unix pastures is the growth forecast for that market. Software vendors such as Ashton-Tate that have made their millions in the DOS market are looking at the growth in the Unix segment, not at an installed base that needs to be served. Ken Rhie, Unix marketing manager of Ashton-Tate's Dbase product, believes the Unix personal database market will

### INSIDE

#### Product Face-Off

Looking Glass and X.desktop compete in the GUI ring. Page 80.

#### Product Guide

A comprehensive list of Unix terminal emulation software. Page 84.

#### On the Plus Side

A programmer details the ups and downs of C++. Page 79.

Brandel is a free-lance writer based in Boston.



grow by 50% to 100% this year. "As a company, you have to expand the business," Rhie says. "You can't just stick with a stabilized industry standard like PC-DOS."

According to Judith Hurwitz, an analyst at Patricia Seybold's Office Computing Group, a market research firm in Boston, the movement to Unix results from two ironic industry dynamics. One, she says, is code-writing proximity. The other is users' growing impatience with OS/2.

Hurwitz says that developers were already writing new Microsoft Windows Version 3.0 and OS/2 programs in C. As a result, moving to Unix was not difficult, compared with translating code written in Natural into a Unix application. Nevertheless, turning a DOS-based application into Unix is difficult.

"We did a lot of optimization for the platform, like profiling," Wraight says. "To do a file retrieve on a Sparc architecture, we had to do line-by-line edits because the data file formats of 1-2-3 are designed in the Intel architecture."

The code conversion has the effect of slowing down the product, especially in terms of video performance.

"DOS is synchronous; Unix is asynchronous," says Bob Kruger, manager of Unix business development at Microsoft. "The user makes an input with an application designed for DOS, and it goes off looking around the Unix operating system and then eventually comes back to you. There is a difference in response."

"In the PC world, you just take over the hardware and go right to the video registers on the PC," Wraight says. "With Unix, you are twice removed from the operating system. The video code is written to the windowing implementation, which writes to the operating system, which writes to the hardware."

"As a result, when running 1-2-3 with video performance on a Sparc system, the performance was close to that of our DOS version on a 386-based Compaq/25," Wraight continues. "Without video on that 12.5-MIPS Sun, we were much faster in terms of raw performance."

#### On the bright side

There is an upshot to this, however. "The tools make Unix a lot easier to deal with once it's over there," Wraight says. "On the Sun system, we had to develop for three different products optimized for three different hardware architectures. But it wasn't that bad just using a common source tree in Unix."

Autodesk's Autocad product was one of the lucky ones. Because the company developed the application on a Unix-based system from the beginning, it did

not have to make a DOS-to-Unix transition like other DOS vendors. Autocad currently runs on Unix, Ultrix, Xenix/SCO, Sun OS and Hewlett-Packard Co. Apollo Division's Aegis — all different flavors of Unix.

"It's actually easier to get out a Unix product," says John Forbes, manager of Unix products at Autodesk. "We develop on a Sun workstation because of the debugging environment and then move it over to DOS."

Others have shrink-wrapped their application code so tightly for DOS that they are finding the transition to Unix formidable.

For example, Wordstar International says it would like to have an application that runs on Unix. "The assembly language cannot be ported," says Amy Master, a marketing manager at the Naveto, Calif.-based company. "We are already big in gov-

even want to do some sorting in 10 minutes or less on a 360M-byte database, a PC can't do it. You'll just bog the processor. It needs more horsepower."

Meanwhile, some users are unwilling to wait for the unproven OS/2.

"We are here to support the business, and we are in a competitive business," Messina says. "I need to have the applications and my people working on them today."

"I've played around with OS/2, and I wasn't impressed," says Daryl Jones, IS communications manager at the South San Francisco Police Department. "I need the applications now, and I have budget restrictions. That rules out OS/2."

Jones is also enjoying cost savings. Users at the police department work on dumb terminals connected to Intel 80386- and I486-based servers, running The Santa Cruz Operation's Xenix 2.3.2. The system is loaded with a Wingz database and Wordperfect.

In one arrangement, Jones is supporting 16 users on one \$8,000 server, including software and printer-sharing equipment. On a PC LAN, it would cost him an average of \$2,500 per user.

Jones adds that daily maintenance is eased. "We don't have to put the burden of file maintenance on the user, and we aren't stuck with the training," he says.

"On Unix, backups are automated by the system administrator, and meanwhile, the users are already familiar with the applications. Definitely the way to go."

But not everyone sees such

N.Y.-based accounting firm that uses Wordperfect Version 4.2. "There is a slight problem if you want to go back and forth between the two systems. We have to use the little labels that they send you to make the distinction clear."

The problem gets exacerbated when Alloway takes a floppy disk with files off the Unix system and tries to run the application on her IBM PC-compatible portable system at home. "It gets confusing," she says.

**T**HIS SYSTEM gives us more power than we could have . . . with a PC LAN and not even near the cost."

PETER MESSINA  
ROYAL ALLIANCE

This problem could be overcome by one of Unix's greatest strengths: graphical user interfaces based on the X Window System. Pointing and clicking could erase the function key problem for most applications.

"Let's face it: People aren't moving over to Unix for its command line," Forbes says. "But then, if you use a GUI, your performance takes about a 20% to 40% hit and puts it at about the same level of a PC. And with Autocad, we can suck up as much performance as a workstation can deliver."

"We definitely have concerns about developing a product to run on an X windowing GUI," Kruger says. "You're talking about a lot of horsepower."

dealers' shelves? According to a recent study conducted by DMR Group, Inc. in Toronto, only 8% of 2,750 U.S. companies on the desktop, compared with 10% for OS/2 and 65% for DOS, currently have Unix installed.

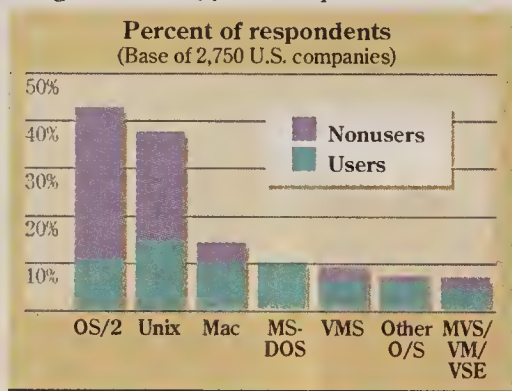
The story of Unix on the desktop is another chapter in the bigger problem of the scalable operating system. Without one standard, the market and users will continue to be divided and forced to make choices.

"Until there is one standard



#### Now and then

More people have OS/2, DOS and Macintoshes on their desktops than Unix; however, current and prospective users rate it high in terms of future importance



Source: DMR Group, Inc.

CW Chart: Paul Mock

ernment sales and have a great interest in developing products and taking advantage of our presence. There is a group of people in this company who are frustrated about it."

"There is definitely a growing interest in Unix now that commercial applications are making the crossover," Hurwitz says. "But it's happening in bits and pieces — it's not just one big wave."

Despite this, she says, the window for Unix to get to the desktop is wide open, especially because OS/2 is failing to capture users' hearts and minds.

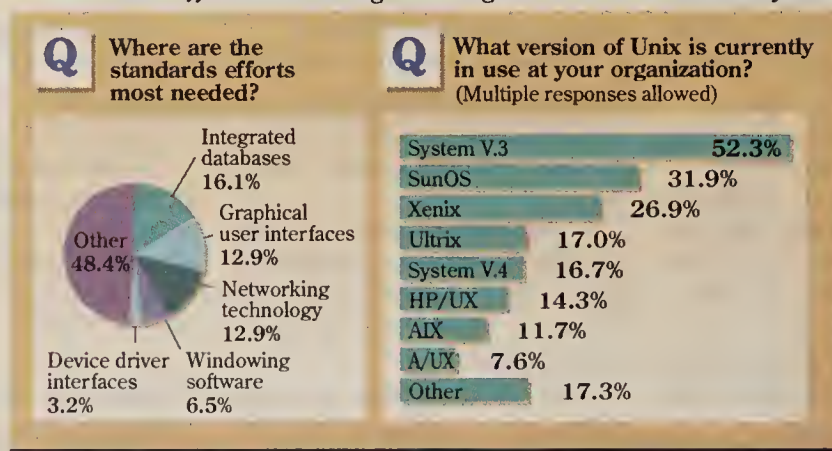
"Applications like databases, spreadsheets and graphics have got to move upward, somewhere," Hurwitz says. "People want to use the applications they know, and Unix is letting them make their move."

One of the most restrictive aspects of DOS is that it was designed with Intel Corp. 8086 or 8088 processors in mind, both of which run at less than one million instructions per second (MIPS). Meanwhile, the Intel I486 chip is now churning at 10 MIPS.

"If you think of the limitations of DOS — like the 640K-byte memory barrier, the hard disk size, I/O performance, lack of security — there are a lot of things DOS PCs are simply just not designed to do," Rhie says. "If you

#### Hurry along

Members of Uniforum, the worldwide association of Unix users, agree that standards efforts are moving in the right direction but too slowly



Source: Uniforum

CW Chart: Paul Mock

transparency between the two versions of these products. Despite most vendors' claims to the contrary, there are a few things users will have to get used to when they use traditional DOS applications in Unix. For example, Microsoft Word has a tendency to flicker on Unix terminals and runs at a slower speed.

"Our Unix keyboards look the same as a PC keyboard," says Cheryl Alloway, IS director at Ronder & Legg, a Kingston,

However, Wraight counters, that is just the point with Unix — you run it on systems with horsepower, such as reduced instruction set computing-based workstations. "This is exactly why we are specifically developing for a 12.5-MIPS Sun workstation."

All of this, of course, begs the question: If Unix is so great and application developers are scrambling to get a piece of the action, then why aren't mobs of businesses rioting to pull it off

Unix operating system for these developers to write to, commercial Unix will suffer," says John Dunkle, an analyst at Workgroup Computing in Hampton, N.H. "You can preach the virtues of Unix: scalability, great networking, cheap, whatever. But try to explain where it's going to be a few years down the road — you can't. Who is going to buy into that?"

#### Even development race

For now, developers will. All software developers contacted, with the exception of OS/2 advocate Microsoft, say their development efforts are split evenly between Unix and OS/2.

"I have a lot of work to do before I sell \$200 million annually in Unix," Rhie says. "Then, we would introduce the Unix product first. But, for now, I can say that soon the Unix product can be introduced only 30 days after the DOS version."

But again, the failure of OS/2 to capture the desktop gives the developers another migration path to frustrated DOS users.

"I don't want to speculate," Rhie says. "But let's just say I would not be surprised if in time my revenues from Unix are greater than OS/2."

"We're crystal-balling here, but there is a real opportunity for Unix here and now," Forbes says. "It is obvious that DOS users have to migrate up somewhere, and that question is, where?"

"The key is for the Unix market to standardize on a GUI, whether it is OSF/Motif or Open Look or whatever — and stick with it," Forbes says. "If they standardize, they could attract a tremendous number of DOS users to come over. But if they continue with more of the same politicking, that will give OS/2 application development and support a chance to catch up." •



# A programmer's view of C++

## FIRST PERSON

BY ALEXIS TATARSKY



Programming in a Unix environment used to be fairly devoid of choices, and when it came to what language to program in, there was no choice at all: C was it, and the C language was standard across hardware platforms and versions of Unix.

Those were the good old days. Now there are several versions of the C language to choose from, including ANSI C and object-oriented versions such as Objective C and C++.

In 1988, my firm selected C++ as its language of choice for future development efforts.

The C++ language is an evolutionary step beyond original (Kernigan and Ritchie) C, beyond ANSI C and into object-oriented techniques (see story this page).

Since C++ is essentially a superset of C, most C programs will run virtually unchanged through a C++ compiler. C programmers can learn the language incrementally, using features as they learn them but producing real code all along.

Also, existing C code does not become obsolete: As modules are added or rewritten, C++ features can be used while leaving the rest of the code unchanged.

There are two classes of differences between C++ and C: improvements to the original language and the addition of object-oriented features. Even without using the object-oriented aspects, it is still worthwhile to use C++ instead of C. The most vital of the nonobject-oriented improvements include the following:

- **Function prototypes.** In C, it is a common error to call a function with the

wrong number or order of parameters. In C++, function prototypes help avoid this problem. These prototypes, which typically appear in the header file, instruct the compiler about the number and types of parameters a function expects to receive.

- **Overloaded functions.** Function prototypes also make it possible to perform function overloading, or the existence of two or more functions with the same name. Using the prototype, the compiler can differentiate between the "overloaded" functions based on the types of parameters they expect.

ANSI has adopted function prototypes, as well as several other features of C++, to include in ANSI C.

- **Call-by-reference.** C++ passes parameters by reference rather than value, reducing the need for pointers — one of the hallmarks of the C language.

- **In-line functions.** In C++, the preprocessor is de-emphasized by the addition of in-line functions and true constant declarations. An in-line function is better than a C "#define" because it can check for the number and type of its parameters and have a true return value.

The real edge with C++, however, comes when you use its object-oriented features: "classes" and "inheritance." In C++, the term class refers to user-defined structured data types. Objects are defined as instances of a class, just as the C language definition:

```
int age; /* define a variable age of type int */
```

defines "age" to be an instance of the type "int."

A class can provide (and enforce) data hiding through the use of "private members," which are fields invisible outside of the class itself. Public members provide an interface to the private data.

A class defines not only data fields but also functions that can act on objects of

the class. Such "member functions" can provide a public interface to the private data of the object itself.

As an example, here is a class definition:

```
class stack { private:
char stack—data[MAX]; // a private data item
int top; // a private data item
public:
void push(int x); // a public operation
int pop(); // a public operation
};
```

By implementing an abstract data type by using public interface functions and a private set of data representing the state of an object, the programmer can separate the implementation of a class from its public interface.

Even if the (private) implementation changes, the interface can remain exactly the same: Code using the data does not even have to be recompiled. This highlights one of the primary benefits of C++ — its maintainability.

Different classes can also have members (including member functions) of the same name. This eliminates the "name space pollution" problem of traditional C.

For instance, classes "jet" and "truck" can each have a member function "fuel()", and the compiler will understand which one is being invoked by the context.

```
jet my 747; // define a jet object
truck mack; // define a truck object
```

```
my747.fuel(); // invokes the fuel function for a jet
mack.fuel(); // invokes the fuel function for a truck.
```

"Inheritance" refers to the ability to "derive" one class from another. If one has already defined a class called, for example, "vehicle," one can derive a class from vehicle, such as "truck." Objects of truck will have all the characteristics of objects of vehicle. The class truck would add characteristics specific to trucks, such as gross tonnage and type of trailer.

The latest version of C++ allows for "multiple inheritance." This allows a programmer to derive one class from more than one other class: Truck may be derived not only from vehicle, but also from "diesel" and from "depreciable asset."

Class derivation not only allows for sharing of characteristics and functions between classes with a common ancestor ("car" and truck might both be derived from vehicle) but is also a simple technique for reusing existing code.

If one has a class defined for truck, one might define "bus" in terms of truck rather than starting over again from vehicle: A bus is like a truck, except that it differs in the following ways...

C++ programs are centered on class hierarchies. Designing the classes and their interrelation (hierarchy) is the most vital phase of the development cycle. In our experience, C++ cuts development time and dramatically reduces maintenance time when compared with a conventional language. •

## The darker side

There are two sides to every story, and so it is for C++. The language offers many benefits to a programmer, but there are trade-offs as well, mostly attributable to people's unfamiliarity with it.

Its benefits include the following:

- Better reusability of code over C++.
- Better maintainability of code.
- Enforcement of good programming practices.
- Encouragement of good design practices.
- Compatibility with existing C code.

On the other hand, the language itself is still in some flux, with new features being added and standardization efforts under way by ANSI and AT&T. And while the languages themselves are compatible, many tools designed to work with C do not yet have C++ interfaces.

In addition, the number of proficient C++ programmers is still small. Even though C programmers can be retrained rapidly, there is a significant ramp-up effort. Rather than thinking about the logical procedural flow of the program, the analyst's attention is instead given to designing the data "objects" on which the program is to perform. Along with the objects themselves are the operations (also called methods or functions) that are to be performed on the objects. This object-oriented approach — in which the data is central — makes for robust and modular programs.

Lastly, debugging C++ code can be difficult because many debuggers do not understand the concept of class, inheritance, virtual functions and other C++ features. Instead, one has to debug the C code generated by the C++ interpreter — code which is difficult to map to the C++ source.

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# Toward a friendlier view

*Looking Glass and X.desktop are two ways to look at Unix*

## PRODUCT FACE-OFF

BY DAVID FIEDLER

People still tend to fear Unix's "hundreds of commands." Well, it's true; Unix does have hundreds of commands. It's also true, however, that most users will never need to learn and use more than two dozen — the same number and type of commands they use on MS-DOS, MVS or any other operating system.

Old perceptions die hard, however, and only a radically new user interface may convince people that Unix is finally usable by mere mortals. That's why Sun Microsystems, Inc. introduced its Open Look graphical user interface and Open Software Foundation (OSF) rolled out its OSF/Motif.

What isn't always apparent amidst the hoopla, however, is that Open Look and Motif are not user-oriented interfaces in the same way as, say, Microsoft Corp.'s Windows Version 3.0. Instead, they are

dards. While they are somewhat similar in many ways, they will most likely appeal to two different user types.

Both products require about the same amount of random-access memory. X.desktop's executable size is between 250K and 400K bytes, and a minimum of 2M to 4M bytes of RAM is required for X.desktop to function. Binary code on Looking Glass uses about 600K bytes, and it requires 4M bytes of RAM.

However, Looking Glass seems to be the faster of the two products, with a proprietary tool kit that enables it to run at a blinding speed. X.desktop uses Motif's tool kit.

On Looking Glass, the user is first presented with a screen that displays several windows, including a home directory. On both products, applications are chosen by clicking on an icon, although Looking Glass allows you to use either icons or names. Both vendors say the next version of their products will support colorable icons.

One difference in screen appearance is that with Looking Glass, you are presented with the home directory when you boot up the system. On X.desktop, the user sees the desktop as he left it.

In its current version, X.desktop's Help capabilities are easy to use. The user simply clicks an icon to pull up a dialogue box. Version 3.0, due out in January, will offer context-sensitive Help with graphics.

Visix says Looking Glass Version 2, due out next month, will offer a context-sensitive, hypertext-based Help system accessible via a hot key. Besides Help func-

tions, the new version will also provide a "tree view" of the file system and the ability to save specific desktop layouts by name.

Where the products differ is in their customization abilities and techniques. On Looking Glass, users can specify their preferences and options to a very detailed degree. For instance, it has an interactive window proportion and color-setting facility as well as an integrated icon editor for those who require extra customization for the more than 450 icons supplied.

All customization can be performed by the end user because it is interactive, with the system offering prompts and users responding by clicking on an icon. First-time users should be able to use the product without customization after reading the user's manual.

The degree to which you can customize X.desktop, however, is more comprehensive than Looking Glass. Far beyond customizing icons, it allows you to assign a text editor, such as Microsoft Word or Wordperfect from Wordperfect Corp., to each of your files. You can also set up the system to execute a string of commands simply by clicking on an icon.

It would be up to a programmer or a very experienced user to go into the rule files to make these types of changes.

Configuration is also more complex on X.desktop. In fact, Looking Glass comes only with a user's guide, while X.desktop also supplies a configuration guide. Both

companies say their products are ready to run when delivered.

Although the customizing needs to be done by someone other than the typical end user, the result is a simpler looking system. Whereas Looking Glass at first glance appears to be the more sophisticated of the two products, IXI's design philosophy seems to be "keep it simple."

X.desktop's interface is targeted at less sophisticated users who want to work with an easy-to-use, Macintosh-style graphical representation of a desktop. Looking Glass may have more appeal for the Unix power user or system administrator.

Looking Glass is bundled with Pyramid Technology Corp.'s file servers and will run on workstations from Data General Corp., Intergraph Corp., Stardent Computer, Inc., Motorola, Inc. and Sequent Computer Systems, Inc. as well as Intel Corp. 80386-based PCs under Interactive Systems Corp.'s 386/IX.

X.desktop is bundled with The Santa

Cruz Operation's Open Desktop, the IBM RISC System/6000 and Personal System/2 with AIX as well as workstations from Unisys Corp., Motorola, NCR Corp., Tektronix, Inc., NEC Technologies, Inc., Panasonic Co. and Dell Computer Corp.

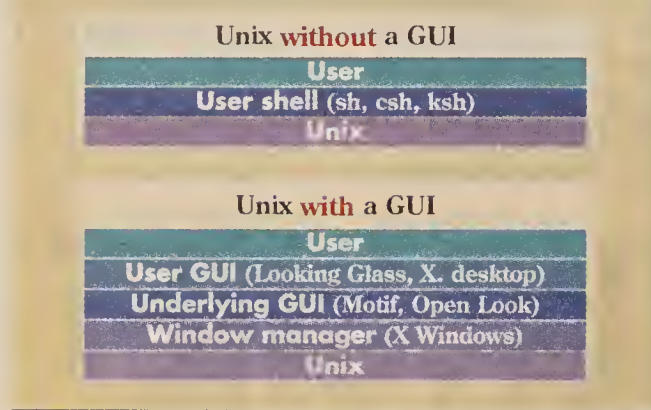
Both products run on all popular workstations from Sun, Digital Equipment Corp., Hewlett-Packard Co.'s Apollo Division, Mips Computer Systems, Inc. and Sony Microsystems Co.

Looking Glass costs from \$595 to \$1,295, depending on the type of platform, plus about \$300 per user. Annual maintenance fees run \$99 per user and include a toll-free number for phone support.

X.desktop costs \$495 for a single user, regardless of the type of platform. Prices drop when ordering licenses in quantity. An annual support contract costs about 15% of the license fee and includes hot line support via facsimile, electronic mail or telephone as well as free product upgrades and technical bulletins. •

## Bring on the GUIs

*There are as many as three layers between the user and operating systems when you use a graphical user interface*



platforms with a "look and feel" that allow developers to write software for them. This software then uses the built-in functions provided by the underlying interfaces to handle such things as screen and mouse interfacing.

Several developers have taken this one step further, writing a user-oriented — rather than programmer-oriented — graphical interface to Unix that utilizes the facilities of one or more of these underlying graphical interfaces. Such programs might be termed "user GUIs" to distinguish them from the lower level interfaces such as Motif and Open Look (see chart).

While there have been a number of menu systems and friendly front ends available for Unix over the years, they were intended for ordinary character-based terminals rather than workstations.

The new graphical user interfaces are few in number and specifically intended for workstations or personal computers running high-resolution workstation software. Two leading examples are Looking Glass from Visix Software, Inc. in Reston, Va., and X.desktop from IXI Ltd. in Cambridge, UK.

Both products are Motif-compliant and adhere to Posix, OSF and X/Open stan-

Fiedler is the executive producer of "Unix Video Quarterly," a video industry newsletter based in Rescue, Calif.

# How to fit the new kid into the old systems environment

BY DENNIS LINNELL

What happens when you install a Unix system in the middle of an existing setup? Consider the following scenarios:

- A retail store switches to a Unix environment but would like to continue using certain MS-DOS applications, such as a spreadsheet for its financial analysis.
- At a hotel, DOS-based personal computers at the check-in counter are connected on a local-area network to a Unix-based midrange system. Throughout a working day, front desk staff members need to access files residing on the midrange processor.
- Economists working at a brokerage firm need to access data stored on an IBM mainframe from the Unix-based workstations on their desktops.

Not too long ago, this type of connectivity problem would have sent customers back to the software developer. Today, however, new categories of products are allowing corporations to pursue their own strategies to fit Unix in with existing operating systems, such as MS-DOS, VAX/VMS, MVS and VM.

There are two common scenarios in which companies need to integrate Unix with another operating system. In the simpler case, a user wants to run MS-DOS-based applications on his Unix-based workstation. For these people, there is DOS emulation software.

Things get more complicated when the workstation or PC user needs to access data from a host computer across a LAN. These people need to look into terminal emulation, file transfer or file-sharing techniques.

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## DOS emulation

Virtual emulation software loaded on a Unix computer creates a "virtual machine" within the system, allowing it to run DOS-based applications. There are two different types of this software: packages that operate independently and software that needs to interact with the virtual machine hardware built into Intel Corp. 80386 and I486 chips.

With the latter type of software, the microprocessor is put into "virtual 8086" mode, so instead of using the addressing scheme found on a workstation, the application uses the smaller 1M-byte range found on a PC.

Nevertheless, both products on the market today — VP/ix from Interactive Systems Corp. in Santa Monica, Calif., and Merge 386 from Locus Computing Corp. in Inglewood, Calif. — take advantage of Unix's virtual memory and paging. In addition, Unix memory management and scheduling features remain unchanged. In fact, DOS applications never see any of the Unix features, and Unix applications are unaffected by the DOS emulator.

While software-only products require that no changes need to be made to the Unix kernel, both VP/ix and Merge 386 require a few tweaks to the operating system to make it aware of the 386-based chip. However, operating system overhead is kept to a minimum, and system stability is unaffected.

To emulate the PC's I/O hardware, VP/ix provides a full set of BIOS functions, which translates most I/O requests into equivalent Unix system calls. DOS-based applications can transparently share files and I/O devices with Unix applications.

Interactive and Locus sell their products to hardware vendors on an OEM basis. An obvious drawback to the virtual machine strategy is that many Unix-based workstations — including those marketed by Digital Equipment Corp., Silicon Graphics, Inc. and Sun Microsystems, Inc. — use reduced instruction set computing (RISC) chips, which do not emulate the Intel 8086 microprocessor.

Linnell is president of Gate Technology, Inc., a consulting firm in McLean, Va.



Some hardware vendors fix this problem by providing a suitable Intel microprocessor as a coprocessor or emulating Intel 8086 instructions in software running on the Unix system. For example, Sun's Sun IPC provides an Intel coprocessor on a circuit board, allowing many users to access it through a network.

While this is a workable solution, it is also an expensive one: The add-on boards can cost thousands of dollars.

A second approach is to choose software that emulates both the Intel 8086 and DOS. An example is Soft PC from Sunnyvale, Calif.-based Insignia Solutions, which also markets its product to hardware vendors on an OEM basis.

Although this software is inexpensive, it also delivers slower performance than the virtual machine strategy. For instance, workstations with a microprocessor equivalent to the Motorola Corp. 68030 provide performance equivalent to that of an IBM Personal Computer AT.

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### Terminal emulation

You can run terminal emulation software on a Unix machine to access a non-Unix system or you can run it on a PC to access a Unix machine. Either way, this software, which costs about \$500 for Unix and \$100 on a PC, allows incompatible systems to communicate by making one computer appear like a group of compatible terminals to another computer.

Terminal emulation software runs as a process in the Unix system and provides functions comparable with terminal emulators for PCs, such as Procomm Plus from Datastorm Technologies in Columbia, Mo.

The most common terminals emulated are asynchronous — including the DEC VT100 and IBM 3101 — but the synchronous IBM 3270 is popular as well.

It uses both IBM's Systems Network Architecture (SNA) and binary synchronous (bisynch) protocols. While SNA is more popular and up-to-date, many Unix systems still support bisynch protocols.

Terminal emulators connect to a host computer in two major ways. Most use the EIA-232 (previously called RS-232) interface to connect to modems. These modems hook up to conventional telephone circuits, which physically link the systems together.

A newer type of connectivity involves using a LAN, such as Ethernet or token-ring. This provides higher speeds but shorter distances than modems.

Most terminal emulators can also perform file transfers using either Xmodem, Kermit or 3270-based file transfer using IBM's IND\$FILE protocol.

Regardless of protocol, such file transfers have significant drawbacks. Transferring many files can be time-consuming and tedious. The entire process is potentially error-prone, and recovery can be difficult.

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### File transfer via TCP/IP

With Transmission Control Protocol/Internet Protocol (TCP/IP), file transfer is greatly simplified. Not only do most Unix systems attach to networks that use this protocol, but TCP/IP provides its own terminal emulation through two sets of protocols — Telnet, which emulates asynchronous terminals, and TN3270, which supports 3270-style terminals.

TCP/IP also has a file-transfer protocol, called FTP, which sends entire files across the TCP/IP network. Nearly all Unix operating systems, such as IBM's AIX for the RISC System/6000 computer family, provide these protocols.

TCP/IP operates on practically every vendor's computers. For example, IBM's TCP/IP for MVS software product enables the largest mainframes to communicate with Unix systems via TCP/IP. This lets Unix users exchange files with and access applications on the MVS system. TCP/IP operates concurrently with the customer's SNA communication network; Unix does not disrupt existing production work.

Several vendors have implemented TCP/IP under DOS on the PC. PC/TCP from FTP Software in Cambridge, Mass., is a typical product. It provides many functions not offered in terminal emulation products. For example, it lets the PC operate as a network server or client.

With the PC as a server, clients on the Unix system can request files to be transferred to or from the PC. Unix users can send output to a printer on the PC. PC/TCP also has an electronic mail package, so PC users can exchange mail with users on the Unix system or anywhere else on the network.

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### File-sharing

The closest integration achievable — as well as the most complex and expensive — is file-sharing via Sun's Network File System (NFS), a network software package that uses the services of TCP/IP. With file-sharing, users get not only a

**V**IRTUAL EMULATION software loaded on a Unix computer creates a "virtual machine" within the system, allowing it to run DOS-based applications.

copy of a file but the file itself.

NFS uses TCP/IP to allow users to access files and I/O devices on a remote system and never know it; it is as transparent as if they were on their own systems. In essence, NFS provides virtual disks.

The file from the remote system appears as an extension of the local file system. For example, if a PC user wants to load a Unix file into its word processor, the file appears as though it were on drive D on the PC.

NFS also provides remote printing and command execution. A PC user can print on the Unix system by simply directing the PC's LPT2: Output to NFS. The user can tell the system to run programs or utilities on the Unix system and send the results back to the PC. These same options are available between mainframe systems and Unix.

These options for integrating Unix — which are expanding almost daily — also work well in combination. In a sophisticated setup, a PC user connected to a Unix system could log on to a VAX using a terminal emulator and simultaneously access the Unix system's files using NFS. The same user can have sessions with the mainframe using TN3270. Other users with asynchronous terminals can run Lotus Development Corp.'s 1-2-3 spreadsheet using VP/IX on Unix. •

## ASK THE VENDOR

We are currently connecting our server running Xenix to our Novell network using Atlantix's Coconet. We are planning to move to a Unix environment and would like to know how we can accomplish this move while still maintaining the systems we are now using.

*Chris McMorrow  
Director of MIS  
Hotelecop  
Miami, Fla.*

I have a copy of the DOS version of Zyindex text retrieval as well as your new Zyindex for Unix. How compatible are the features of your MS-DOS product with your Unix product? Do they work in exactly the same manner? What differences are there, if any?

*Gregory Johnson  
Attorney at Law  
Owner/Operator  
Law Office Management Services  
Seattle, Wash.*

**ATLANTIX CORP.:** Atlantix's new interoperability product, Atlantix Axxess, provides transparent access among Unix, Novell, IBM LAN Manager and Transmission Control Protocol/Internet Protocol-NFS networks. Atlantix Axxess also interoperates with Atlantix Coconet on Xenix systems. By simply installing Atlantix on any standard personal computer running SCO Unix, you will have access to Unix, Xenix and Novell files as well as applications across all systems, with no necessary change to the current environment.

Additionally, Atlantix Windowview will allow DOS-based Windows users to access applications across all systems simultaneously from DOS workstations.

**ZYLAB CORP.:** The look and feel of Zyindex for Unix is different from the DOS product, but it is still quite easy to use.

Both versions of the text retrieval system allow users to employ a range of search techniques, including Boolean, proximity, wild-card and synonym searching.

Numeric and date-range searches are also available.

New design features for Unix include drop-down menus, dialogue boxes and concurrent displays of multiple queries. New search features include a query history, an interactive dictionary of searchable terms and a clipboard for pasting new queries from retrieved data.

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# Terminal emulation for Unix integration

VENDOR	PRODUCT	EMULATION PROVIDED <sup>1</sup>	UNIX VERSION SUPPORTED	HARDWARE PLATFORM	TERMINAL EMULATION	OPERATES ACROSS WHICH LOCAL-AREA NETWORK	MEMORY REQUIREMENTS (BYTES)	FILE-TRANSFER PROTOCOLS SUPPORTED	WINDOW ENVIRONMENTS SUPPORTED	MAXIMUM NUMBER OF SESSIONS/VIEWING METHODS	USER-DEFINABLE KEYBOARD MAPPING	MAXIMUM MODEM SPEED SUPPORTED	HIGH-LEVEL LANGUAGE PROGRAMMING APPLICATION SUPPORT	PRICE
Active Ingredients, Inc. (617) 576-2000	Communicae	Unix to DOS, Unix, VMS	MACH	Next	DEC VT100, VT220, Tektronix 4010, 4014	Ethernet, TCP/IP	Less than 200K	Kermit, Xmodem, Ymodem	Next	1	Yes	19.2K	No	\$395
Apple Computer, Inc. (408) 996-1010	Macterminal Version 3.0	Macintosh to Unix, VMS	NP	Macintosh Plus, or later	DEC VT102, VT320, TTY	Appletalk	1M	ASCII, Xmodem, Xmodem Text, proprietary	Macintosh	Varies/Menu	No	57.6K	No	\$125
Beame & Whiteside Software Ltd. (416) 648-6556	BWTEL	DOS to Unix, VMS	All versions	IBM PCs and compatibles with Ethernet adapters	DEC VT52, VT100	Ethernet, TCP/IP	128K	FTP, NFS, Kermit, Xmodem, TFTP	MS Windows 3.0	8/window, hot key	Yes	19.2K	No	\$195
The Bristol Group Ltd. (603) 437-3700	Isoterm	Unix to VMS	AIX, Domain OS, SunOS	Apollo, IBM RS/6000, Sun	DEC VT340	Decnet, TCP/IP	1M	None	Sunview, Apollo Display Manager, OSF Motif	NP/window	Yes	All	Yes	\$600
	Isotek	Unix to VMS	Domain OS, SunOS	Apollo workstations, Sun	Tektronix 4000, 4100, 4200 series	Decnet, TCP/IP	2M	None	Sunview, Apollo Display Manager	NP/window	Yes	All	Yes	\$3,990
Century Software (801) 268-3088	Term	DOS to Unix, Unix to DOS	Unix System V Release 2, 3, SCO Unix, Xenix, System III, Berkeley 4.0	Over 150 hardware platforms	ANSI 3.64, DEC VT52, VT100/102, VT220, Wyse 50, 60, SCO Color Console, Adm1, Televideo 912, 925, TTY	None	512K	Kermit, Xmodem, Ymodem, Modem7, WtermCRC, TermCRC	MS Windows 2.11, 3.0, X Windows	1	Yes	37.9K	Yes	\$195 (DOS), \$495 (Unix)
	Termnet	DOS to Unix, Unix to DOS	NP	Over 150 hardware platforms	ANSI 3.64, DEC VT52, VT100/102, VT220, Wyse 50, 60, SCO Color Console, Adm1, Televideo 912, 925, TTY	Most major networks	512K	Kermit, Xmodem, Ymodem, Modem7, WtermCRC, TermCRC	NP	101/hot key	Yes	37.9K	Yes	\$695
	Term for X Windows	DOS to Unix, Unix to DOS	NP	Over 150 hardware platforms	ANSI 3.64, DEC VT52, VT100, VT102, VT220, Wyse 50, 60, SCO Color Console, Adm1, Televideo 912, 925, TTY	NA	640K	Kermit, Xmodem, Ymodem, Modem7, WtermCRC, TermCRC	X Windows	11/window	Yes	37.9K	Yes	\$695
Coefficient Systems Corp. (212) 777-6707	Coterm	DOS to Unix, VMS	All versions	IBM PCs and compatibles	DEC VT52, VT100, VT220, VT240; Tektronix 4010, 4014	Banyan, 3Com, Novell, Ungermann-Bass, Int. 14	320K	ASCII, Kermit, Xmodem, Vtrans	NP	1	Yes	19.2K	NP	\$195-\$329
Concept Omega Corp. (908) 560-1377	Thoroughbred terminal emulator	DOS to Unix, VMS	Unix System V, Release 3 and higher	IBM PC XT's, AT's and compatibles	Wyse 50, 60	None	10K	None	Any that Wyse 50 or 60 can support	1	No	19.2K	Yes	\$195
CM1 (603) 448-5193	MLINK	DOS to Unix, Unix to DOS	Unix System V, BSD Unix, Xenix, AIX	IBM PCs and compatibles	Altos III, AT&T 605, DEC VT100, VT220, NCR 7930, Televideo 910, 925, 950, Wyse 50, SCO ANSI console	NP	163K	Kermit, Xmodem CRC, Xmodem 1, proprietary	None	1	Yes	38.4K	Yes	\$195-\$250
Datanetics (412) 363-3282	Datalator	Unix to DOS	NP	IBM PCs and compatibles	Televideo 905, Wyse 50	Novell	256K	Open architecture, programmer hooks available	None	1	Yes	9.6K	No	\$150
Digiboard, Inc. (612) 922-8055	Double View	DOS to Unix, Unix to DOS	All versions	IBM PC XT's, AT's and compatibles; Personal System/2s	DEC VT100, VT200, SCO ANSI console, Interactive AT/3, Wyse 60	None	64K	Proprietary enhanced version of Kermit	None	7/hot key	Yes	38.4K	No	\$239 (8 users)
Diversified Computer Systems, Inc. (303) 447-9251	EM 320	DOS to Unix, VMS	All versions	IBM PC AT's, PS/2s and compatibles	DEC VT 52, VT100/102, VT220, VT320	Decnet, Excelan, FTP PC/TCP, Novell, 3Com, Sun PC-NFS, Ungermann-Bass, Wollongong	170K	ASCII, Kermit, Xmodem	Desqview, MS Windows 3.0	8/hot key	Yes	9.6K	Yes	\$189
	EM 4010	DOS to Unix, VMS	All versions	IBM PC AT's, PS/2s and compatibles	DEC VT 52, VT100/102, VT220, VT320, VT640, Tektronix 4010, 4014	Decnet, Excelan, FTP PC/TCP, Novell, 3Com, Sun PC-NFS, Ungermann-Bass, Wollongong	220K	ASCII, Kermit, Xmodem	Desqview, MS Windows 3.0	8/hot key	Yes	9.6K	Yes	\$249
	EM 4105	DOS to Unix, VMS	All versions	IBM PC AT's, PS/2s and compatibles	DEC VT 52, VT100/102, VT220, VT320, VT640; Tektronix 4107, 4105, 4010, 4014	Decnet, Excelan, FTP PC/TCP, Novell, 3Com, Sun PC-NFS, Ungermann-Bass, Wollongong	260K	ASCII, Kermit, Xmodem	Desqview, MS Windows 3.0	8/hot key	Yes	9.6K	Yes	\$359
Eicon Technology Corp. (514) 631-2592	Access/X.25	DOS to Unix	NP	IBM PCs, PS/2s and compatibles with Eicon card	DEC VT52, VT100, TTY	Any Netbios LAN, Novell Netware	100K	ASCII, proprietary	None	9/hot key	Yes	NP	No	\$1,095 (software and hardware)
FTG Data Systems (714) 995-3900	EMU-TEK 4025	DOS to Unix	All versions	IBM PCs, PS/2s and compatibles	Tektronix 4025	None	265K	None	None	1	No	19.2K	No	\$795
	EMU-TEK 4200 Plus	DOS to Unix	All versions	IBM PCs, PS/2s and compatibles	DEC VT100, Tektronix 4010, 4014, 4105, 4107, 4207, 4208	DEC PCSA, Ungermann-Bass, Net/One, Novell Netware for VMS, Novell NACS, IBM LAN ACS, FTP PC/TCP	512K-640K	Kermit, Xmodem	None	6/menu	Yes	38.4K	No	\$950

<sup>1</sup>Ties between other environments available.

The companies included in this chart responded to a recent survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Further product information is available from the vendors.



How Long  
Will You Have  
To Wait For  
VSE/ESA  
Software  
Solutions?



# UNIX ON THE DESKTOP

## PRODUCT SPOTLIGHT

VENDOR	PRODUCT	EMULATION PROVIDED <sup>1</sup>	UNIX VERSION SUPPORTED	HARDWARE PLATFORM	TERMINAL EMULATION	OPERATES ACROSS WHICH LOCAL-AREA NETWORK	MEMORY REQUIREMENTS (BYTES)	FILE-TRANSFER PROTOCOLS SUPPORTED	WINDOW ENVIRONMENTS SUPPORTED	MAXIMUM NUMBER OF SESSIONS/VIEWING METHODS	USER-DEFINABLE KEYBOARD MAPPING	MAXIMUM MODEM SPEED SUPPORTED	HIGH-LEVEL LANGUAGE PROGRAMMING APPLICATION SUPPORT	PRICE
FTG Data Systems (714) 995-3900	EMU-TEK Five Plus	DOS to Unix	All versions	IBM PCs, PS/2s and compatibles	DEC VT100, Tektronix 4014, 4105, 4010	DEC PCSA, Ungermann-Bass, Net/One, Novell Netware for VMS, Novell NACS, IBM LAN ACS, FTP PC/TCP	512K	Kermit, Xmodem	None	6/menu	Yes	38.4K	No	\$495
	EMU-TEK Seven Plus	DOS to Unix	All versions	IBM PCs, PS/2s and compatibles	DEC VT100, Tektronix 4014, 4105, 4107, 4010	None	512K-640K	ASCII, Binary	None	1	Yes	38.4K	No	\$695
	EMU-TEK Level 1	DOS to Unix	All versions	IBM PCs, PS/2s and compatibles	DEC VT100, Tektronix 4010, 4014	None	256K	ASCII, Binary	None	1	Yes	19.2K	No	\$95
	EMU-TEK Level 2	DOS to Unix	All versions	IBM PCs, PS/2s and compatibles	DEC VT100, Digital Engineering VT640, Tektronix 4010, 4014	None	256K	ASCII, Binary	None	1	Yes	19.2K	No	\$295
FTP Software, Inc. (617) 246-0900	PC/TCP	DOS to Unix, Ultrix, Xenix	NP	IBM PCs and compatibles	DEC VT220	TCP/IP	512K	Proprietary FTP, RCP	MS Windows 3.0	10/window	Yes	9.6K	No	\$400
Grafpoint (408) 446-1919	TGraf series	DOS to Unix	NP	IBM PCs, PS/2s and compatibles	DEC VT52, VT100, VT200; Tektronix 4105, 4107, 4207, 4115	Most major networks	200K	Kermit, Xmodem, Ymodem	DOS Windows	Limited by memory only/window	Yes	Hardware-dependent	Yes	\$195-\$1,995
	TGraf-02 Mac	Macintosh to Unix	NP	Macintosh II series	DEC VT 52, VT100, Tektronix 4107	TCP/IP	1M	Kermit	Multifinder	Same as above	Yes	Hardware-dependent	Yes	\$995
	TGraf-Workstation	Unix to VMS	All versions	Apollo Computer, Data General Avion, Decstation, Vaxstation, HP, IBM RS/6000, Intergraph, Mips, Sun 3/386i, 4, Sparcstation, Silicon Graphics, Intel i860-based PCs, Tektronix 8800	DEC VT52, VT100, Tektronix 4107, 4125	Most major networks	Varies	NP	X Windows, Sunviews	Same as above	Yes	Hardware-dependent	Yes	\$1,005-\$10,000
H&A Computer Services, Inc. (415) 434-3517 (800) 654-3215	PCXVT100	DOS to Unix, Unix to DOS	All versions	IBM PC XTs, ATs and compatibles	DEC VT52, VT100	None	90K	Proprietary	None	1	Yes	9.6K	Yes	\$59
Hewlett-Packard Co. (408) 447-4391	Advancelink	DOS to Unix, Unix to DOS, Macintosh to Unix, Unix to Macintosh	All versions, HP-UX (file transfer)	IBM PC ATs, PS/2s and compatibles, Macintosh	DEC VT100, HP 2392, 2393, 2627, 700/94	HP OfficeShare, LAN Manager, 3Com LAN Manager	270K (DOS), 80K (MS Windows), 200K (Macintosh)	Proprietary Xmodem	Macintosh, HP New Wave, MS Windows	Limited by memory only/window	No	19.2K	No	\$299
Hilgraeve, Inc. (313) 243-0576 (800) 826-2760	Hyper Access/5	DOS to Unix	NP	IBM PC ATs, Intel 80386-, i486-based machines	DEC VT100/102, 220, 320; Teletype 925, 950	None	350K	ASCII, Hyper-protocol, Kermit, Xmodem, Ymodem, Zmodem, Ymodem batch	DOS windows, OS/2 windows	8 (DOS), Unlimited (OS/2)/window	Yes	114.2K	No	\$199
Houston Computer Services, Inc. (713) 493-9900	Octacomm/PC	DOS to Unix	Unix System V and most other versions	IBM PCs, PS/2s and compatibles	DEC VT100, Texas Instruments 931	None	256K	Character Mode	MS Windows, OS/2 Presentation Manager	1	No	19.2K	No	\$125
Hummingbird Communications Ltd. (416) 470-1203	HCL-Exceed, Exceed Plus, Exceed Plus 8514A, Extend	DOS to Unix, Unix to DOS	All versions	IBM PC ATs, PS/2s, Intel 80286-, 80386-, i486-based PCs	X terminals	TCP/IP	640K-1.64M	Proprietary	X Windows	1 (DOS), 32/window, hot key	Yes	NA	NA	\$495-\$595
James River Group, Inc. (612) 339-2521	Ice.TCP	DOS to Unix	Unix System V	IBM PCs and compatibles	ANSI, AT&T 605, DEC VT100, VT220, Wyse 60	Arcnet, Ethernet, Starlan, token-ring	220K	Xmodem, Ymodem	None	1	Yes	38.4K	No	\$195 (per DOS PC)
	Ice.Ten	DOS to Unix	Unix System V	IBM PCs and compatibles	ANSI, AT&T 605, DEC VT100, VT220, Wyse 60	None	45K	Xmodem, Ymodem	None	4/hot key	Yes	38.4K	No	\$295 (per Unix host)
JYACC, Inc. (212) 267-7722	Jterm	DOS to Unix	All versions	IBM PCs and compatibles	DEC VT100, VT220, TTY, proprietary	NP	256K	ASCII, Kermit, Kermit server, Xmodem, proprietary Jtran	None	1	Yes	192K	NA	\$175
KEA Systems Ltd. (604) 431-0727	Zstem 240	DOS to Unix, Unix to VMS	Interactive 386/ix, SCO Unix System V/38	Intel 80386- or i486-based machines	DEC VT52, VT100, VT220, VT240, VT241, VT340; Tektronix 4010, 4014	Novell, LAT, TCP/IP	250K	ASCII, Kermit, Xmodem, Ymodem	None	4/hot key, network	Yes	9.6K	No	\$295
Microlab, Inc. (402) 483-7474	Chitchat	DOS to Unix	SCO Xenix, SCO Unix	IBM PCs and compatibles	ANSI	Mainlan	35K	None	Desqview	2/window	No	2.4K	No	\$79.95
Pacer Software, Inc. (619) 454-0565	Pacerlink	DOS to Unix, Unix to DOS, Macintosh to/from Unix	Unix System V, Release 4.3 BSD	Apollo, DEC, Data General, Harris, HP, Interactive, Mips, Motorola, NCR, Sun	Adds 60; DEC VT100, VT220, VT240, VT241; Data General D46; Teletype 950; TTY	TCP/IP	512K	Telnet proprietary	Macintosh	5-500/window, PC uses split screen	Yes	19.2K	Yes	\$1,200 (five-user license)
Pericom, Inc. (609) 895-0404	TeemX 07, TeemX 340	POS to Unix	AIX, Ultrix	Decstation, IBM RS/6000, Sun Microsystems 3, 4	DEC VT100, VT220, VT340, VT640; Data General D200; Tektronix 4105, 4207, 4211	Ethernet	NP	FTP	NP	NP	Yes	38.4K	NP	\$800
Polygon, Inc. (314) 432-4142	Poly-Cor/320	DOS to Unix, Ultrix, VMS	NP	IBM PC XTs, ATs, PS/2s and compatibles	DEC VT220, VT320	AT&T Stargroup, 3Com, Banyan Vines, Novell	256K	Kermit, XFR plus	None	1	Yes	9.6K	No	\$199
	Poly-Cor/240	DOS to Unix, Ultrix, VMS	NP	IBM PC XTs, ATs, PS/2s and compatibles	DEC VT240, VT241	AT&T Stargroup, 3Com, Banyan Vines, Novell	256K	Kermit, XFR plus	None	1	Yes	9.6K	No	\$299
	Poly-Star/T	DOS to Unix, Ultrix, VMS	NP	IBM PC XTs, ATs, PS/2s and compatibles	DEC VT52, VT100, VT220, VT320, Tektronix 4010, 4014	AT&T Stargroup, 3Com, Banyan Vines, Novell	280K-375K	Kermit, XFR plus	MS Windows 3.0	20/window	Yes	19.2K	Yes	\$229
	Poly-Star/G	DOS to Unix, Ultrix, VMS	NP	IBM PC XTs, ATs, PS/2s and compatibles	DEC VT240, VT241, VT330, VT340, Tektronix 4010, 4014	AT&T Stargroup, 3Com, Banyan Vines, Novell	280K-375K	Kermit, XFR plus	MS Windows 3.0	20/window	Yes	19.2K	Yes	\$329



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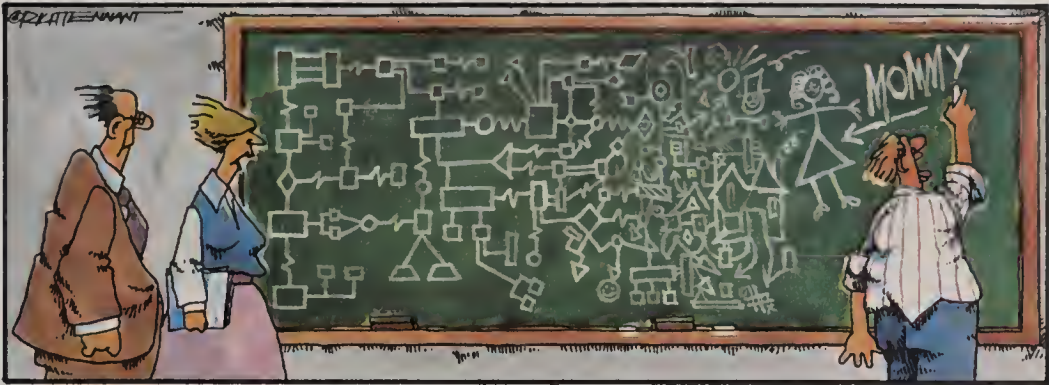
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Rasmussen Software, Inc. (503) 624-0360	MacQT	Macintosh to Unix, Macintosh to NCR ITX	All versions	All Macintosh	ADDS Viewpoint, ANSI, DEC VT100, NCR 7900, Wyse 50	Macintosh	256K	ASCII, Kermit	Macintosh	1	Yes	19.2K	No	\$200
	ANZ10	DOS to Unix, NCR ITX	All versions	IBM PCs and compatibles	ADDS Viewpoint, ANSI, DEC VT100, NCR 7900, Wyse 50	None	170K	ASCII, Kermit	Desqview	1	Yes	19.2K	No	\$200
Scientific Endeavors Corp. (615) 376-4146	VTEK	DOS to Unix	NP	IBM PC XT's, AT's, PS/2s and compatibles	DEC VT52, VT100/102; Tektronix 4010, 4014, 4105	None	256K	Kermit, Xmodem	NP	1	Yes	38.4K	No	\$195
Softel, Inc. (516) 324-1306	PC52	DOS to Unix, Unix to DOS	Unix System V, Release 3	AT&T 6300 series, IBM PCs and compatibles, Zenith laptop	DEC VT52	Starlan, X.25 (via Till Systems Ltd. hardware)	128K	ASCII	None	2/function key	Yes	56K	No	\$30
Softklone (904) 878-8564	Mirror III Version 2.0	DOS to Unix	NP	IBM PCs and compatibles	ADDS Viewpoint; ANSI; D210; DEC VT52, VT100/101, VT220; Honeywell VIP 7200, 7205; Televideo 912, 920C, 925, 950; Texas Instruments 940; Tymnet 78; Wang; Wyse 50, Z29	None	185K-480K	ASCII, Compu-serve-B, Crosstalk, Hayes, Kermit, Kermit server, Xmodem, Xmodem batch, Xmodem 1K, Ymodem, Ymodem-G, Zmodem	NP	1	Yes	300-38.4K	Yes	\$149
Structured Software Solutions, Inc. (214) 985-9901	Facet/PC, Facet/Term	DOS to Unix, Unix to DOS	Unix System V, Xenix	IBM PC XT's, AT's, PS/2s and compatibles	DEC VT100, 220	None	240K (DOS)	Xmodem	None	10/window	Yes	38.4K	No	\$150
Telexpress, Inc. (609) 877-4900	Teleterm-EM	DOS to Unix, Unix to DOS	All versions	Intel 80286-, 80386-, 1486-based machines	ANSI, DEC VT100, VT220, Wyse 60	None	256K	ASCII, Kermit, Xmodem	NP	1	Yes	19.2K	No	\$192
Touchstone Software Corp. (714) 969-7746	TE Works	DOS to Unix	Unix System V, SCO Unix, Xenix, HP-UX, VMS	IBM PCs and compatibles	ANSI; DEC VT100/102, VT220; TTY	Netbios, Starlan, token-ring	256K	ANSI, Kermit, Xmodem, proprietary	None	2/hot key	Yes	19.2K	Yes	\$99, \$145 (LAN version)
	Macline	DOS to Unix	Unix System V, SCO Unix, Xenix, HP-UX, VMS	Macintosh series	ANSI, DEC VT52, VT100	None	512K	ASCII, proprietary	None	1	Yes	9.6K	Yes	\$145
	PC Works	DOS to Unix	Unix System V, SCO Unix, Xenix, HP-UX, VMS	IBM PCs and compatibles	ANSI, DEC VT100/102, VT220, TTY	Netbios, Starlan, token-ring	256K	ANSI, Kermit, Xmodem, proprietary	None	2/hot key	Yes	19.2K	Yes	\$195
Tymlabs Corp. (800) 767-0611	Session for Windows/Session for Macintosh	DOS to Unix, Unix to DOS	All versions of HP-UX	IBM PCs and compatibles, Vectras, AppleMac 512 and above	HP2392, HP2393, HP2397, HP700/94	HP Telnet, Advanenet, BAPI, X.25, HP ARPA services	1M (Macintosh)	Xmodem, Macbinary, proprietary	MS Windows 2.11, 3.0	1-6/window	No	19.2	Yes	\$299
U.A. Systems, Inc. (714) 968-3792	Step, Wstep, UA-LAN	DOS to Unix	All versions	Intel 80286-, 80386-, 1486-based machines, Sun, Motorola	DEC VT100, Espirit III, Televideo, Wyse 350, proprietary	Novell, Lantastic, token-ring	70K	Proprietary	MS Windows 3.0	2/window	Yes	9.6K	No	\$99
Unisys Corp. Contact local sales office	Infoview II Version 3.4	DOS to Unix	NP	Unisys PW <sup>2</sup> , IBM PCs and compatibles	ANSI x3.64, Tektronix 4014	Netbios-compatible	512K	None	Proprietary	1	Yes	9.6K	No	\$300
Walker Richer & Quinn, Inc. (206) 324-0350	Reflection 1, 1 Plus	DOS to Unix, HP-UX	All versions	IBM PCs and compatibles	DEC VT102, HP2392A, HP700/92, HP700/94	Advanenet, Net/One, Novell, Starlan, VIM, IBM LAN, RAF, LAT, Telnet	256K	Kermit, Xmodem, all host applications written for MPE, Unix, Ultrix, HP-UX, VMS	MS Windows	4/hot key	Yes	38.4K	Yes	\$299, \$399
	Reflection 2	DOS to Unix, VMS	All versions	IBM PCs and compatibles	DEC VT100/102, VT220, VT320	DEC Lanworks, PC SA, LAT	90K-200K	Kermit, Xmodem, proprietary	MS Windows, Desqview	8/hot key	Yes	38.4K	Yes	\$199
	Reflection 2 Plus	DOS to Unix, VMS	All versions	IBM PCs and compatibles	DEC VT100/102, VT220, VT320	DEC Lanworks, PC SA, LAT, 3Com, Novell Netware, Netware for VMS, TCP/IP, Ungermann-Bass	90K-200K	Kermit, Xmodem, proprietary	MS Windows, Desqview	8/hot key	Yes	38.4K	Yes	\$269
	Reflection 2 Plus for Macintosh	DOS to VMS	All versions	Macintosh 512K enhanced, Plus, SE, II series	DEC VT102, VT220, VT320	Pacer, Alisa, LAT, TCP/IP	410K	Kermit, Xmodem, proprietary	Macintosh	Limited by memory only/Multi-finder	Yes	576K	Yes	\$249
	Reflection 3 Plus	Macintosh to HP-UX	All versions	Macintosh 512, 512E, Plus, SE, SE/30, II, IIX, IICX	HP2392A	None	256K	Kermit, Xmodem, all host applications written for MPE, Unix, Ultrix, HP-UX, VMS	MS Windows	4/window	No	57K	No	\$399
	Reflection 4	DOS to Unix, VMS	All versions	IBM PCs and compatibles	DEC VT240, VT241, graphic features of DEC VT100/102, VT220, VT320, VT330, VT340; Tektronix 4014	DEC Lanworks, PC SA, LAT	200K-360K	Kermit, Xmodem, proprietary	MS Windows, Desqview	8/hot key	Yes	38.4K	Yes	\$299
	Reflection 4 Plus	DOS to Unix, VMS	All versions	IBM PCs and compatibles	DEC VT240, VT241, graphic features of DEC VT100/102, VT220, VT320, VT330, VT340; Tektronix 4014	DEC Lanworks, PC SA, LAT, 3Com, Novell Netware, Netware for VMS, TCP/IP, Ungermann-Bass	200K-360K	Kermit, Xmodem, proprietary	MS Windows, Desqview	8/hot key	Yes	38.4K	Yes	\$369
	Reflection 7, 7 Plus	DOS to Unix, HP-UX	All versions	IBM PCs and compatibles	HP2627, HP2623A, Tektronix 4010	Advanenet, Net/One, Novell, Starlan, VIM, IBM LAN, RAF, LAT, Telnet	384K	Kermit, Xmodem, all host applications written for MPE, Unix, Ultrix, HP-UX, VMS	MS Windows	4/hot key	Yes	38.4K	Yes	\$399, \$469
	Reflector Series Software	DOS to Unix, Unix to DOS	All versions	IBM PCs, PS/2s and compatibles	4P2392A, HP2627A, UT220, UT320, UT2401241	PC-NFS, TCP/IP	12K-320K	Kermit, Xmodem, FTP, Unix, proprietary	MS Windows 3.0	4/hot key, Session Manager	Yes	19.2K	No	\$199-\$469





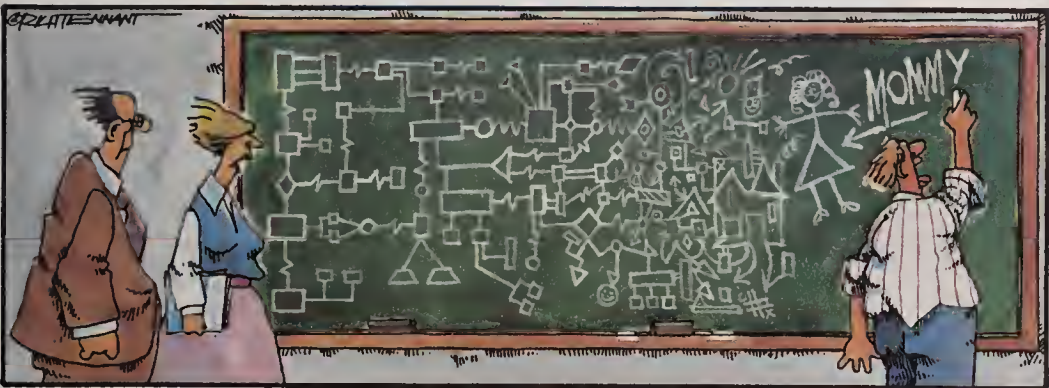
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## Breaking the software logjam

*Forget fancy formulas: Four simple but powerful principles can get developers rolling*

BY TODD HIXON and  
DAN GINSBURG

**S**oftware development is the main obstacle to getting better products out faster for many companies, and it's an area that few chief executive officers feel they have under control. Many view it as a perilous and unmanageable black art.

A few companies have excellent track records in software development, however. An in-depth analysis of their approaches shows that software development *can* be managed effectively. The key is to use an approach that is grounded in the principles of time-based competition while recognizing the special challenges of software engineering.

The president of a successful mobile communications company recently told us: "We've always been a hardware company, but software has become our key technology. Our new product line offers terrific ad-

Hixon, a vice-president at Boston Consulting Group, heads the firm's worldwide high-technology practice. Ginsburg is a BCS consultant experienced in technology and business development.

vances in features and the user interface due to a microprocessor-based design. Our problem is that the software is full of bugs. The product is 18 months late, and customers are screaming and withholding payments because it doesn't work."

### No end in sight

This problem will get worse. During the 1990s, powerful forces will make software even more important. Demand for standards and effective imitation are turning basic hardware functions and architectures into commodities, causing vendors to reach for added value from additional features, user interface development and application-specific design.

Powerful microprocessors, cheap memories and high-level languages greatly expand the range of situations in which products controlled by complex software are practical. And so do vendors of operating systems and communications capabilities. Each of these product development paths is software-intensive.

The lore of software development contains a rich history of warnings to newcomers, particularly in that software developers are artists who cannot be managed, and tra-

ditional approaches to achieving speed (such as using parallel paths, setting deadlines and applying pressure) result in garbage. In fact, there's a classic pattern of disaster in software development that we've often observed and have come to call the slippage loop (see chart page 92).

Yet, the most important differences between the best and the worst performers lie in how they manage the people and the process.

Microsoft Corp.'s CEO Bill Gates has been quoted as saying, "There's only one trick in software and that is to use a piece of software that's already been written." However, that greatly oversimplifies the challenge. Computer-aided software engineering, modularity and software libraries are important, but they are not what distinguish the best performers. Nor do "skunkworks" provide a practical solution. Although they are fast, they are inefficient and disruptive to other products.

Major developers of large complex systems, such as large-scale telecommunications switching equipment and sophisticated radars, are often looking to achieve top-notch improvements in both the speed and quality of their product development. Observing and analyzing the methods and performance of some of the most effective software developers in the world can yield several key lessons.

### It's up to management

The bottom line is that breaking the software logjam is primarily a managerial issue. There are great differences in the time required by different teams and companies to complete projects of similar complexity. (Complexity is measured in lines of code.) The worst performers take as much time to complete simple projects as the best performers require for projects that are three times as complex.


The following four basic principles of fast, high-quality software development have emerged from watching world-class software developers.

• **Shoot for effectiveness.** Effectiveness comes from working smarter, not necessarily faster. A strong focus on increasing the percentage of team time spent on the "main sequence" of work — the irreducible core



- **Mostly a management issue**
- **Poor programs waste time**
- **Learn from the best companies**





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yesterday. A museum of  
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impending doom closed  
burst into the small  
large metal switching  
And I said in a voice  
turn into a Nehru  
then, above the hiss of  
"Relax. You bought an  
you expand, up to 90%  
Investment protection...  
be yours." And as I drove  
I felt good because life, after*



waving good-bye.... I cleaned the garage  
obsolescence. Go-go boots and lava lamps.  
settled around my ankles, this feeling of  
in on me like night. So I rushed to work,  
room most people avoid and stared at this  
device sitting there Buddha-like in the dark.  
soft as a prayer, "Don't get old on me. Don't  
jacket. Grow. Expand. 30,000 lines." And  
the air conditioner, I heard this voice say,  
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of tasks required to produce the product — yields major gains in output accompanied by gains in quality. Must speed come at the expense of quality? No.

An analysis of 16 complex software projects showed that about 30% of engineers' time was spent developing code that became part of the final product. Much of the lost time was caused by interruptions and rework. High-quality output can be greatly increased by managing time and the development process better.

• **Build strong platforms for developers.** Platforms are the superhighways on which fast product development teams race. They include such capabilities as coherent product plans, a well-structured software architecture, anticipatory technology development, libraries of modules

**O**FTEN, THE APPROPRIATE areas for discipline and autonomy become blurred under the pressure of deadlines. Overmanagement causes delay and loss of project team commitment, which leads to specification creep, errors, more delays, and hence, more management — a descending spiral.

and utilities as well as development tools.

Platforms need to be structured and put into place in advance of an immediate need to accelerate the main sequence of new product development.

• **Make communication a religion.** In product development, there is no higher priority than communication. Leading-

edge software developers employ a set of integrated organizational strategies to maximize communication among the key members of product development teams. These strategies encompass areas ranging from business and product-line planning to product team structure, membership, tenure and empowerment.

• **Foster creativity in a disciplined framework.** Bringing the project in on time requires establishing an overall structure of reasonable discipline covering such factors as scheduling, architecture and specifications.

Within this structure, teams must be given a lot of freedom to find the best solutions with minimum interference. High quality has to be the final test. Performance, cost and profit objectives will never be achieved if quality is not high.

Establishing a disciplined schedule requires aggressive but reasonable deadlines. This is an area of concern for many managers but one that can be addressed by benchmarking the performance of top competitors and analogs. Like all aspects of business, software must measure up to



## UDS V.32 Modems: winners at 19.2 kbps—now FastTalk doubles the speed

From the day of its introduction, UDS' V.32 modem has gathered honors from leading computer publications and other industry watchers!

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For accurate communication over

worst-case lines, the unit incorporates V.42 LAP-M and MNP 4 error control functions. A full complement of on-board test functions is included, and eight LEDs provide easy monitoring of the unit's operation and built-in diagnostic features.

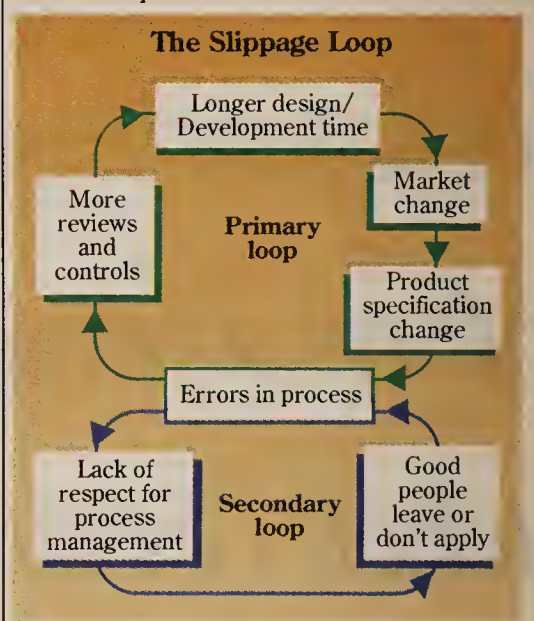
Get acquainted with the latest winner in the UDS V.32 family. For technical details and quantity pricing, contact UDS, 5000 Bradford Drive, Huntsville, AL 35805-1993. Telephone 205/430-8000; FAX 205/430-8926.



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### Charting disaster

*Most software development disasters follow this classic pattern*



Source: Boston Consulting Group CW Chart: Doreen St. John

the competitive environment.

Often, the appropriate areas for discipline and autonomy become blurred under the pressure of deadlines. Overmanagement causes delay and loss of project team commitment, which leads to specification creep, errors, more delays, and hence, more management — a descending spiral.

Fast competitors have achieved a workable balance — which is built into their organization and systems — from team structure to lines of communication, cross-functional measurement and incentive systems.

### High hurdles

The challenges facing software developers are great. Technical solutions are not enough. "Common wisdom" is fragmented and often misleading. Perhaps most importantly, the solution lies beyond the best efforts of isolated individuals.

Improving performance is a system change problem, requiring simultaneous actions in multiple areas as well as vision, investments and struggle. Getting results typically involves a change process that takes six to 12 months.

Experienced guidance and external benchmarks are extremely valuable in accomplishing change quickly and confidently. Companies that have gone through this process have experienced 30% to 50% reductions in elapsed time and 20% to 40% reductions in man-years expended. Most importantly, they find that the same group of engineers become able to deliver 40% more high-quality new products each year.

The logjam can be broken. •



# COMPUTER INDUSTRY

## NATIONAL BRIEFS

### License and registration, please

Within weeks of telling the press that it will vigorously defend its rights in the software licenses that, it says, "are all we've got," software giant **Computer Associates International, Inc.** hauled UK-based professional services firm **Hoskyns Group PLC** into court. What's the charge? Indulging in outsourcing deals that violate CA software licenses. Not so, Hoskyns said. CA is reportedly looking to collect six-figure damages if it prevails.

### Wrong license

Three San Diego computer retailers — **Byte & Floppy Computers**, **Datel Systems, Inc.** and **CCC Computers** — were fined \$2,000 by the **Federal Communications Commission (FCC)** for selling personal computers that were not certified by the FCC for home use. The PCs were certified as Class A, for use in commercial environments. Class B computers, for home use, must meet more stringent requirements for suppression of radio frequency emissions that may interfere with radio and television reception.

## Not many winners in this race

*Makers of campaign software face trying to sell their wares in a skittish market*

BY MITCH BETTS  
CW STAFF

**S**elling computer software to politicians — for keeping track of fat-cat donors, legions of volunteers and those pesky financial reports — seemed like such a sweet idea back in the mid-1980s, when packages with names like Election Machine and Campaign Coordinator hit the market.

After all, 470 seats in Congress are up for grabs every two years, not to mention state and county races. But veterans of this market niche caution that selling software to political campaigns is a tricky game, where quite a few small-time players come and go and very few make a profit.

Arnold Winikoff knows just how brutal the market can be. He tried to sell a high-end hardware/software combo with a \$20,000 price tag and discovered what economists call "price sensitivity." Prospects typically hung up the phone about 15 to 20 seconds after they heard "\$20,000," Winikoff said.

With that marketing effort written off as a failure, Winikoff, president of Minneapolis-based Q.E.D., Inc., has decided to skip this year's election, downsize the system and its price and try again next year. "The wounds haven't healed from beating my head against the wall," he said.

The big campaigns for the U.S. House and Senate and state governorships seem to have a lot of money to throw around to high-priced media consultants, but not much for computers and software. Overall, politics was a \$1 billion industry over the two-year cycle leading up to the 1988 elections, but software spending probably

### Campaign software vendors

*A sampling of campaign software vendors shows that most are willing to sell to either political party, got their start around 1986 and are located near the nation's capital*

Vendor <sup>1)</sup> /location	Started <sup>2)</sup>	Partisanship
Aristotle Industries, Inc. (Washington, D.C.) Campaign Software, Inc. <sup>3)</sup>	1983	
Grass Roots Systems, Inc. (Falls Church, Va.)	1986	
Hannibal Software, Inc. <sup>4)</sup> (Washington, D.C.)	1983	
Headlee Systems, Inc. (Farmington Hills, Mich.)	1986	
Political Publishing Co. (Alexandria, Va.)	1987	
Primary Systems, Inc. (Falls Church, Va.)	1989	
SD Associates (Hartford, Conn.)	1984	
Victory Technology, Inc. (San Francisco)	1986	

1) A sampling of major vendors, not an exhaustive list. 2) Commercial software sales

3) Subsidiary of Aristotle 4) Recently spun off from LSW, Inc.

CW Chart: Paul Mock

amounted to less than 5% of the total, according to John Aristotle Phillips, president of Aristotle Industries, Inc. in Washington, D.C.

"It's a tough market to break into," acknowledged Howard Langston, president of the 1-year-old Primary Systems, Inc. in Falls Church, Va. "I think we're going to make it, but there are a lot of companies out there that don't."

Indeed, the industry seems to be in a perpetual state of shakeout. Three years ago, Aristotle Industries bought competitor Campaign Software, Inc. More recently, LSW, Inc. in Landover, Md., sold its Hannibal software unit — which it had acquired in 1988 — to a

group of investors led by Jim McCarthy, former president of Campaign Software and president of the new Hannibal Software, Inc. in Washington, D.C.

In addition to the acquisitions among the market leaders, there are the so-called garage-shop operations. "There are lots of small, one- or two-person operations that come in every two years and sell a half-dozen packages, and then they'll go out of business," industry pioneer Phillips said.

"Most of our customers nowadays are people who are not on their first software program. People are bringing us a database that's mangled, or the

*Continued on page 95*

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## COMMENTARY

Jean S. Bozman

## RDBMS: The future is still uncertain



In the universe of relational database management systems, the firmament is shifting — and it isn't all that clear which stars will rise and which will set.

Just two years ago, the brightest stars in the West Coast RDBMS world were easy to pick out: Oracle, Ingres, Sybase and Informix. As the two largest purveyors of RDBMS technology — that is, outside of IBM — Ingres and Oracle were at each other's throats back then. They traded barbs in their advertising campaigns and key executives made veiled references to "the arch-enemy" at industry conferences. Ingres styled itself as "the good guy," complete with white hats sported by attendees at the company's May 1990 user conference in Salt Lake City. Oracle, which didn't par-

the lines around the Ingres RDBMS product and software tools. Ask's equity partners, EDS and Hewlett-Packard, which fueled the acquisition with \$60 million, intend to provide vertical market applications and consulting services to Ingres users.

At Oracle, there is some question about future research and development plans. Worries about support and service surfaced at the recent International Oracle Users Group conference in Anaheim, Calif. [CW, Oct. 1]. The prospect of future financial instability is also beginning to dampen enthusiasm for Oracle products at some large sites. Users are voicing concerns about the degree of vendor dependence that a large-scale Oracle financial application would create.

Meanwhile, a fundamental change in the way IS handles multiple DBMSs is taking place. The growing user movement toward open standards and Unix will lessen the proprietary — and therefore the profit-making — value of the raw DBMS engines. Leveraging standards, users are now able to mix and match data from multiple databases.

This technical change, along with a large installed base of nonrelational databases, helps explain why the RDBMS industry is hitting the wall. The impending recession is breeding conservatism in users' purchasing plans. In reaction, Oracle and Ingres/Ask are both shifting toward software tools and applications software. Informix recognized the trend first, as it moved to alliances with more

than 2,000 value-added resellers. Even Sybase, the smallest of the RDBMS bunch, is now willing to sell its tools and its network servers independent of its database engine.

No one wants their vendor to be fighting for survival — or even for profitability. No one likes their vendor to be acquired. Most of all, no one likes to guess at the future viability of the RDBMS product that warehouses a corporation's vital sales information. Yet, we will all have to live with this uncertainty in early 1991 until a new picture of these two wounded RDBMS gladiators begins to emerge.

Bozman is *Computerworld's* West Coast bureau chief.

**T**HE RECENT NEWS about Ingres and Oracle has prompted a fair amount of uncertainty, but few knowledgeable observers fear an immediate impact on either companies' product lines.

ticularly seem to mind its "bad-boy" image, never flagged in its attempts to criticize its competitor across the San Francisco Bay.

Today, their duel is ancient history. Oracle, in the wake of a collision with its first major financial obstacle [CW, Sept. 24], has its worries cut out for it right in its own backyard. Ingres, which struggled along on low cash reserves for most of 1990, is now awaiting the final moves in its pending acquisition by nearby Ask Computer, Inc.

The recent news about Ingres and Oracle has prompted a fair amount of uncertainty, but few knowledgeable observers fear an immediate impact on either company's product lines. At least the near-term survival of both the Ingres and Oracle product sets is guaranteed by the time it takes to migrate data into new DBMS structures. However, uncertainty about whether that "survival" will mean the continued support of all existing products is what's sending shivers of fear down many users' spines. Right now, most users are adopting a wait-and-see attitude while nervously tapping their feet.

At Ingres, no one is sure what eventual shape the new Ask organization will take. That should become clear after the merger is finalized at the end of this month. Early reports indicate that it will be a blended entity, with much blurring of

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## Winners

CONTINUED FROM PAGE 93

company's no longer in business," he added.

John Stalcup, president of San Francisco-based Victory Technology, Inc., said the short-timers typically lack the financing needed for continuing software development and nationwide marketing.

The few vendors who are making a profit in the campaign market have found that they must keep the software price below \$5,000 and provide turnkey consulting services to bring in supplementary revenues. "I don't think we would be making any profit if we just sold software," said John Convy, president of

Grass Roots Systems, Inc. in Falls Church, Va.

Consequently, several of the leading vendors are diversified, providing campaigns with sophisticated databases that contain not only politically relevant information on every registered voter in the state but also demographic data about them for targeting campaign mailings. Aristotle Industries has gone even further by publishing a trade magazine, *Campaign*, designed to serve as an advertising vehicle.

One problem facing companies in the industry is competition from people close to the candidate — such as a law partner, the cousin at MIT or "Uncle Buck" — who are willing to write custom software for the campaign. That may work in very

small campaigns, but Uncle Buck's software will be lacking in support, documentation, timeliness and richness of features, the vendors said.

Stalcup noted that his software has been through three revisions, 8,500 man-hours of programming and 32,000 lines of code. "Uncle Buck's not going to do that in three months," he said.

### But which?

Each vendor has had to make a strategic decision about whether to sell only to candidates of one political party (see chart page 93). Close ties to one political party can be a marketing advantage, but that strategy also cuts an already-small market in half.

Explaining why his company works

only with Democrats, Convy said, "I want people to be comfortable discussing their campaign plans . . . and sending us their donor lists for us to import into our package." However, most of the other vendors are willing to sell to either of the two parties.

"There's not a whole lot of sense in being a partisan company if you're just going to be a computer software vendor. If you're going to be a consultant as well, there are reasons to stay partisan," Langston concluded.

All of the vendors are gearing up for the big 1992 election season, when there will be a slew of competitive races brought on by redistricting and retirements, as well as the presidential campaigns.

Some of the older software packages, first written in the early 1980s, will have to be updated with graphical user interfaces and speedier processing, according to McCarthy. He said the big question for each vendor is, "do they make the investment [in rewriting the software] or do they get out of the business and move on?"

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## Software campaign

**A**n informal survey of vendors found that the campaign software market has a variety of challenges, some of them peculiar to politics:

- **Entrenched incumbents.** Often, office-holders see little need for computers when they keep winning elections by landslides without them. For 19-term U.S. Rep. William H. Natcher (D-Ky.), who spent only \$8,397 on his 1988 re-election campaign and won with 60% of the vote, a computer "would only take up valuable family-picture space on his desk," noted *Campaigns & Elections* magazine.

- **Multiple competitors.** Campaign software vendors are not only competing among themselves but also against other big-ticket campaign expenditures, mostly for television advertising and direct-mail services. In addition, some campaigns are content using conventional spreadsheet and word processing software.

- **Multiple decision-makers.** Buying decisions are usually made by two or three campaign leaders, including the campaign manager or top political consultant, the treasurer and the computer manager, according to John Convy of Grass Roots Systems.

- **Compressed timing.** A campaign is like a corporation with 300,000 records that pops up overnight and closes two years later. "One day in the campaign cycle is worth 20 corporate years," Convy said, so campaign managers expect to have their computer systems up and running virtually the day after they decide to buy them.

MITCH BETTS



# Early earnings figures up despite slowdown

BY RICHARD PASTORE  
CW STAFF

The first rush of third-quarter earnings showed the rich getting richer, the perennial also-rans running stronger and one behemoth still struggling to build momentum.

Outstanding numbers from **Microsoft Corp.** would seem blase by now if not for the fact that the company remains one of the few consistent bright spots in the industry. This quarter, the leading personal computer software vendor was buoyed by revenue from Windows 3.0, which caught fire upon release earlier this year.

## 1990 third-quarter earnings

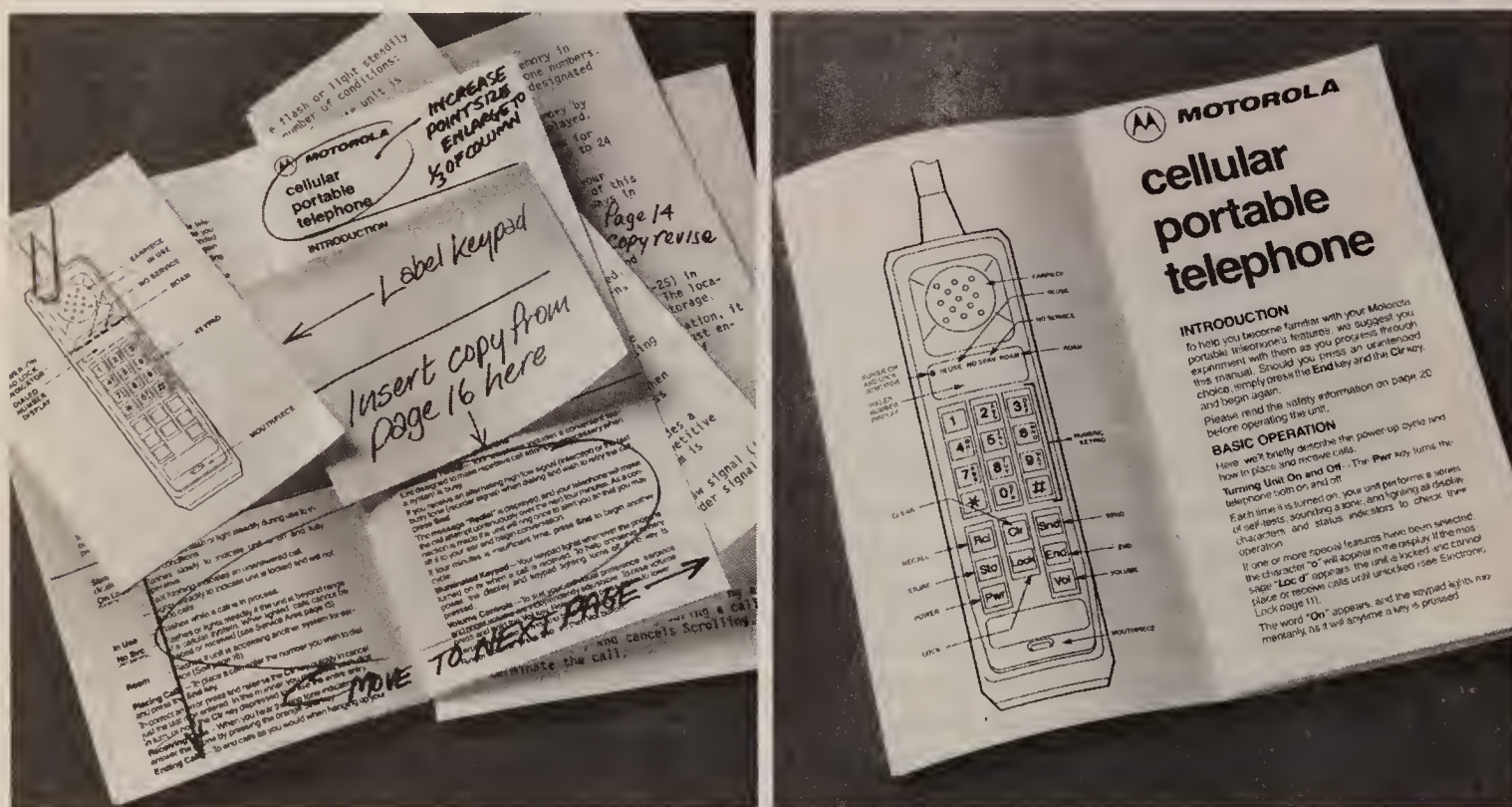
Most companies experienced double-digit earnings gains

Company	Revenue July through September (in millions)	Percent change from 1989	Net income July through September (in millions)	Percent change from 1989
AST	\$136.3M	19%	\$11.4M	293%
Borland International	\$52.6M	109%	\$5.99M	112%
Cypress Semiconductor	\$55.6M	7%	\$8.3M	4%
Exabyte	\$39.2M	64%	\$6.1M	96%
Microsoft	\$369.4M	57%	\$87.6M	77%
NCR	\$1.5B	9%	\$91M	(3%)*

\*Parentheses indicate a reduction or loss

CW Chart: Doreen St. John

# XEROX



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The manuals are now printed on Xerox laser printers just minutes after the revisions flash across the screen of a

Xerox workstation. Turnaround time is 80% faster. Costs are down 50%. And the documents produced are 99.99966% perfect.

Of course, Motorola isn't the only client that Rich Graphics uses Xerox for. And the resulting improvement in customer satisfaction has helped Rich Graphics double their printing business every year since they came to Xerox.

Which just goes to show that a partnership with Xerox can also help a company rewrite its bottom line.

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However, Microsoft's smaller competitors are not rolling over and playing dead. Toiling in the shadows of the big guys for years, **Borland International** is finally seeing its products gain significant penetration into the PC applications market.

Borland's Quattro Pro spreadsheet, a new version of which shipped last week (see story page 14), and Paradox database management software packages in particular are logging hefty sales gains at the expense of Lotus Development Corp. and Ashton-Tate Corp., according to surveys by Computer Intelligence in La Jolla, Calif. [CW, Oct. 15]. The copyright infringement lawsuit that has been lodged by Lotus has not seemed to dissuade many users from embracing the Borland products.

Another so-called second-tier player, **AST Research, Inc.**, again posted double-digit gains despite single-digit prospects for overall PC sales growth. AST is doing it largely on the strength of high-end PC sales.

"Increasing sales of higher performance systems — our Premium 386 and 486 computers — continue to provide AST with growth in both revenue and earnings," AST President Safi Qureshey said.

Machines based on Intel Corp.'s 80386 chip accounted for 60% of the quarter's sales at AST, a 77% increase over the comparable period last year, the company said. Intel 486-based sales also grew 20% from the preceeding quarter.

### Not all good news

The news was not so cheery at veteran systems maker **NCR Corp.** Though revenue was up 9% for the quarter, net income dipped, prompting Chief Executive Officer Charles Exley Jr. to downgrade his expectations for the year.

"We still expect to achieve growth in revenue and earnings per share for the full year," Exley said.

However, "As a result of disappointing U.S. order levels in the second and third quarters, it now appears unlikely that we will achieve net income growth for the full year," he said.

NCR suffered a "considerable decline" in U.S. orders while noting a gain in overseas orders. Unfortunately, excluding currency adjustments on backlogged orders, the U.S. dollar value on worldwide orders declined during the quarter, Exley revealed.

Chicago-based **Arthur Andersen & Co.** had an exceptionally good year, the company reported at its annual worldwide partners' meeting in San Francisco last week. For the year ended Aug. 31, Andersen's total revenue rose 23% to \$4.16 billion from \$3.38 billion the year before.

While Andersen's audit and business consulting operation grew 18% to \$2.28 billion, the greatest growth was in its other business unit, Andersen Consulting, which grew 30% compared with the previous year to \$1.88 billion. Total worldwide personnel increased at the company to 56,800 from 51,400, and the number of worldwide partners increased to 2,292 from 2,134.

One of the first chip makers to report, **Cypress Semiconductor Corp.**, heralded the news of better things to come. Belying the purported industry slowdown, Cypress experienced record demand for its products. The company posted its second-best quarter ever for new orders, according to Cypress President T. J. Rodgers.



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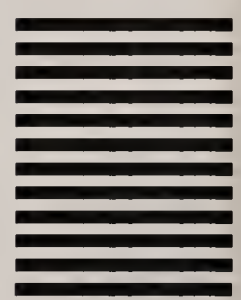




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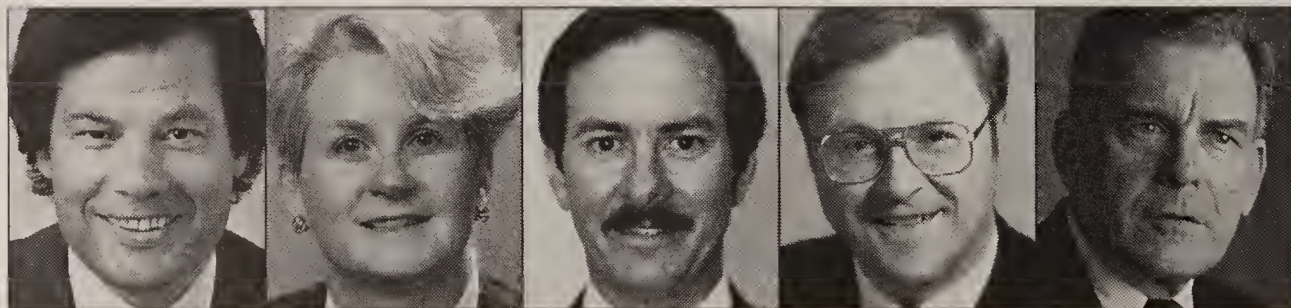


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# COMPUTER CAREERS

## Making the leap to academia: Take care

BY SHERYL KAY  
SPECIAL TO CW

Being the first to formulate ideas and pass them on to others was part of Jack Rockart's motivation to leave IBM 25 years ago and join the faculty at MIT in Cambridge, Mass. He is now the director of the Center for Information Systems Research at MIT's Sloan School of Management.

Two years ago, Bruce Kavin achieved the vice-presidency of information services for a division of The Dun and Bradstreet Corp. but found himself working considerably more than the average work week and enjoying it less. After these first stages of burnout, Kavin decided to pursue a Ph.D. in MIS at the University of Georgia in Athens and, upon completion, seek a university faculty position.

After 13 years at Control Data Corp., Michael Smith chose to head into the academic world where, he says, there is more of an emphasis on leading-edge technology and research. He is currently the associate director of computer operations at the National Center for Supercomputing at the University of Illinois.

### Making the switch

However, IS professionals considering a move to academia must be strongly motivated; it's a major career change, a different culture, and many allowances have to be made.

First, IS executives may find it difficult to reverse direction if they find the academic world is not for them, says Dianne Edmondson, president of systems recruit-

ing firm ACP, Inc. in Denton, Texas. "I've never had a client say 'my ideal candidate would come out of academia,'" she says. Companies would prefer to hire someone from an environment similar to their own, such as a competitor. Many firms, she continues, believe the old saying "those who can't do, teach" and will view a faculty position negatively. "And although that obviously isn't true, we are talking about perceptions, not reality," she says.

A second major consideration is salary. The average nine-month salary for an industry executive entering the teaching profession at a university (holding a Ph.D., of course) ranges from \$36,000 to \$55,000. Those with 10 or more years of university-level teaching experience can expect anywhere from \$60,000 to \$90,000. These industry executives are often leaving jobs that carry six-figure incomes.

Third, obtaining a Ph.D. — which can take upwards of three years or more — is essential if you're interested in becoming a professor at a top-level university. Some of these schools will hire a nondoctoral degreed teacher but will treat him like a second-class citizen, according to Kavin. Without a Ph.D., he would have been referred to as a visiting executive or something similar, he says.

If you're heading into research, you must publish articles in industry journals as well as academic treatises, says Lewis Leeburg, a 31-year veteran of IBM who is now teaching at the University of Califor-

nia, Los Angeles. This should be done while in the corporate world and during doctoral studies, says Leeburg, who learned that his publications list was on the lean side.

Leeburg says he was able to obtain a lectureship position — not a tenured faculty track position. Therefore, he is not eligible for a professorship, does not have sabbatical rights and can't vote in the academic senate.

### Cultural adjustments

Seven years later and now the director of the IS research program at the Anderson

Graduate School of Management at UCLA, Leeburg says that possibly the most difficult adjustment was the cultural change.

When Leeburg first started teaching in 1983, he says, he was "scared to death." He had taken over someone else's syllabus and says that he felt a little lost. "I had been making presentations for years at IBM, but the nature of the audience is totally different in a university classroom. By the end of the first quarter, I was no longer scared to death, but it took me about three years before I felt totally in the groove," he says.

An adjustment Rockart is still dealing with is the slower pace. "Everything in academia is longer term," he observes, "and the rewards may not be as visible or as concrete."

Also, Leeburg finds that universities are more frugal when it comes to travel

and reimbursement expenses, while companies are flexible.

"They understand you may not always have a receipt for, let's say, a call from a telephone booth, whereas a university might view a \$10 dinner as being expensive and unnecessary," he says.

### Common denominators

Whatever the motivation for these former IS executives — burnout, wanting to work on the leading edge of technology — a common goal they all share is the desire to mentor and work in a learning environment.

"One of my favorite tasks at D&B was developing subordinates and mentoring, which, in academia, I can do full-time," Kavin says.

"What really turned me on at IBM was the learning, not the money," Rockart says. After four years, however, he felt most of the learning was behind him at IBM, while with a job in academia, he would be in a teaching/learning environment forever.

Although teaching is secondary to Rockart's research duties, he says, "I get a kick out of working with young, bright people who are hungry to learn."

Maxine Rockoff, a senior administrator for the Carnegie Commission in Manhattan, reaps the advantages from both worlds. In her current consulting position with the commission, Rockoff maintains a corporate-level income, while her part-time teaching positions at New York University and the Polytechnic Institute of New York fulfill her desire to teach. "I love doing something that matters," Rockoff says.

Kay is a Tampa, Fla.-based business consultant and free-lance writer specializing in emerging technologies and human resources.



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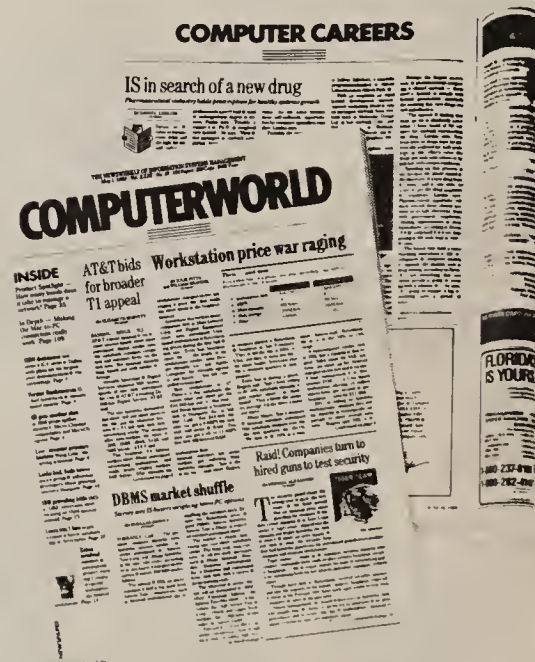
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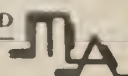
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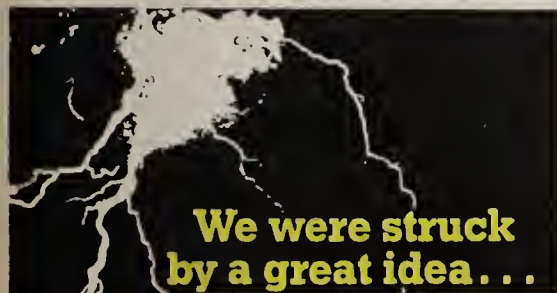
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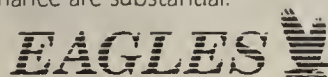
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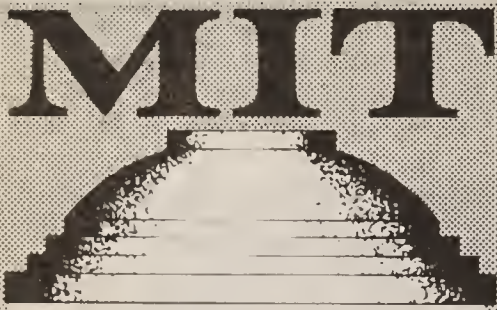
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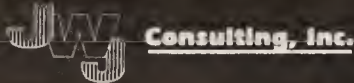
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SENIOR ACP/TPF SOFTWARE ENGINEER required. Will Work in the Systems Engineering Department on the analysis and design of software systems to maintain and support the organization, accessibility and availability of all real time systems information and databases. Skills to be utilized will include ACP/TPF, BAL (Basic Assembler Language) and the test tool development language CMS (Conversational Monitoring System). Applicants required to have Bachelors Degree or its equivalent in Computers, Math or Engineering with at least four years ACP/TPF, BAL and CMS Programming and Analysis. Programming experience must be in the area of real time software systems design and not merely in area of applications programming. Annual salary will be \$45,000.00/year for a 40-hour work week. Additional salary up to \$50,000.00/year may be paid if education and experience warrant. Must have proof of legal authority to work in the United States. Interested applicants contact the Oklahoma Employment Security Commission (7202), 3105 E. Skelly Drive, Tulsa, Oklahoma 74105-7202. Phone: (918) 749-6861. Refer to job order number 091281. Ad paid by an Equal Employment Opportunity Employer.

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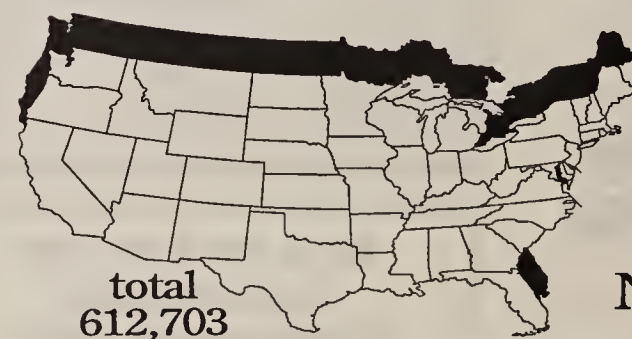
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PROGRAMMER/ANALYST: Will design, develop, modify, and analyze a CICS program to convert present computer systems to an IBM on-line system using database programming. Will use PL/I language on an IBM mainframe hardware within the OS/MVS operating system to effectuate necessary results. Will develop a data conversion development system for a major manufacturer. Requires M.S. degree in Computer Science or Master's degree in Mathematics with a major in Computer Science. Also requires one year experience in the job to be performed or one year experience as a Research Programmer. Entire experience must include using PL/I in an IBM on-line system implementing CICS program. Hours: 9:00 a.m. - 5:00 p.m. 40 hours per week at \$32,000.00 per year salary. Please send resume to: ILLINOIS DEPARTMENT OF EMPLOYMENT SECURITY, 401 South State Street - 3 South, Chicago, Illinois 60605, Attention: Leon Donegan, Reference #V-IL-1868-D, NO CALLS, AN EMPLOYER PAID AD.

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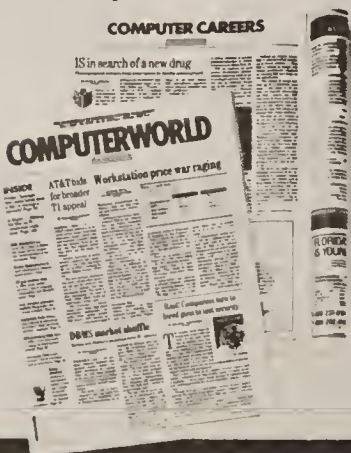
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## Computer leasing in Europe: Getting a handle on the rules

BY NORM BARTLETT  
SPECIAL TO CW

During the past two decades, European computer leasing companies have undergone a transition similar to those in the U.S. The free-and-easy entrepreneurial approach of the '70s gave way to the mergers-and-acquisitions era of the '80s. Because of this shift, leasing firms of the '90s are following stock exchange disclosure rules more strictly and adopting more traditional accounting practices. What follows is an overview of leasing procedures — European style.

Banks, which play a much larger role in European leasing than in the U.S., control several computer lessors. These firms have handled changes in the computer marketplace with confidence because of ready access to substantial funding from the owning banks.

Leasing in most European countries ranks alongside bank borrowing and other forms of medium-term credit for financing. Thus, leasing companies are offering attractions to the customer such as planning, software applications, maintenance and other things competitors can't offer.

Operational leasing — leasing for a fixed period without obligation to purchase — has steadily become more popular than financial leasing. Operational leasing is preferred at times of business

uncertainty or when new products are expected from computer suppliers.

Finance charges are a big factor in European leasing rates. These differ widely from country to country. Rates are partly determined by national economic policies as a means of controlling money supply

### European leasing facts

- In 1989, European users spent approximately \$55 billion on computers and equipment — 17% of which is attributed to leasing companies, according to New York market research firm Frost & Sullivan.
- Europe's largest lessor is IBM, followed by Hewlett-Packard Co., ICL and Nixdorf Computer Corp.
- The most significant U.S.-controlled computer lessors in Europe are Bell Atlantic Corp., Bellsouth Corp. (Dataserv) and Comdisco, Inc.

(thus, inflation) and exchange rates (thus, international competitiveness). These aspects affect the level of economic activity through availability of credit, price of exports on the international market and cost of imports on the domestic market.

The largest independent lessor in Europe until April 1990 was Atlantic Com-

puter. In that month, the chickens from its controversial "flexlease" scheme came home to roost, and the receivers were called in. The collapse was big enough to sink its parent company, British & Commonwealth Holdings. The biggest European independent leasing company now operating is ECS, a subsidiary of French bank Societe Generale.

Belgium is one of the few countries that has a clear legal basis for leasing, restricted to industrial products used in the way of business. Office equipment and computers make up about one-third of all leasing. The largest leasing firms are subsidiaries of the Big Three Belgian banks.

French leasing is strictly supervised. Firms involved must be banks or other qualified financial bodies, although operating leases are entirely outside the regulated French leasing business.

The Finanzministerium lays down detailed rules for leasing in Germany. For example, a lease must last for at least 40% and not more than 90% of the depreciated life of the asset. The life of the asset is laid down in the federal tax tables, which list the depreciation rates for virtually every type of equipment that a firm could acquire. For a computer, it is five years.

In contrast to the general tendency in other countries for operational leases, Italian firms prefer financial leases. Vendor leasing is quite important in the office equipment sector, where Ing. C. Olivetti & Co. dominates the market.

The Dutch take a pragmatic view of leasing and consider economic benefit to be more important than legal ownership.

The fiscal advantages of leasing have been steadily draining away in the Dutch market since 1986, so that there has been no dramatic growth in leasing.

The conduct of the Spanish leasing market is still dominated commercially and financially by banks and banking subsidiaries. Because Spanish firms are very anxious to copy the successes of firms in other countries, computer leasing has experienced rapid growth.

A major problem that Swedish leasing firms have faced in recent years has been the blow-hot, blow-cold attitude of the government. In 1983, after almost trebling from the previous year, leasing came in for a period of control, which caused the business to halve in 1984. Regulations were relaxed in 1985, and leasing expanded.

Leasing was slow to become accepted in Switzerland mainly because of conservative attitudes of financing.

The UK was a boom town for fast-growing leasing companies in the 1980s. The rise and fall of Atlantic Computers says it all. British leasing in the future will be dominated by suppliers and banks.

This verdict on the UK is true of the continent as a whole. As the Open Market of 1992 approaches, the European Commission will be imposing rules on the tax and accounting treatment of leases, which will strengthen the role of bankers and other institutions even more.

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Bartlett is a researcher and journalist based in Chelmsford, England, who specializes in European computer topics.



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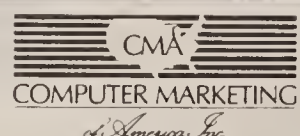
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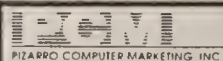
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AT Model 339	\$1,025	\$1,300	\$900
PS/2 Model 30-286	\$1,250	\$1,300	\$1,125
PS/2 Model 60	\$1,500	\$1,800	\$1,400
PS/2 Model 70P	\$3,375	\$3,400	\$3,175
Compaq Portable II	\$975	\$1,050	\$875
Portable 286	\$1,275	\$1,450	\$1,100
SLT 286	\$2,600	\$2,625	\$2,000
Portable 386	\$2,700	\$3,000	\$2,500
LTE 286	\$2,000	\$2,100	\$1,850
Deskpro 286	\$1,375	\$1,400	\$1,200
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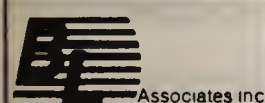
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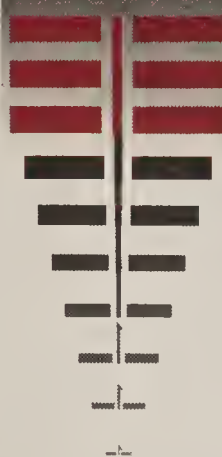
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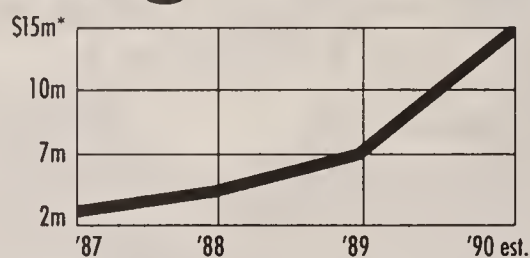


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# TRAINING

## Stimulating students

Technology-delivered instruction can spice up training sessions

BY JESSICA KEYES  
SPECIAL TO CW

**H**ow many of you remember sitting in a classroom and watching one of those boring filmstrips? The lights are dim, the fan from the projector is hypnotically whirring, and a voice, somewhere in the darkness, is speaking in a very soothing monotone. Just about the only thing keeping you awake is the piercing beep between each slide frame.

As a former schoolteacher, I've learned to keep teaching interesting and interactive. From performing magic tricks for the class to having the class construct towers made of Lego blocks, the method to this madness is stimulation. But lack of stimulation seems to be the problem with most technology-delivered instruction (TDI) programs today.

TDI, an acronym coined recently by the computer training industry, encompasses computer-based training (CBT), video, interactive video, multimedia and

more. In trying to understand the role of TDI in corporate training, the National Training and Computer Project (NTCP) in Raquette Lake, N.Y., conducted a survey of 250 computer training managers. The survey unearthed the following:

- Some 97% of those surveyed were using TDI.
- The most popular form of TDI is video; the second most popular is CBT.
- 100% of the respondents were interested in interactive video, but only 13% had actually implemented an interactive video training program.
- Instructor-led training continues to be the No. 1 mode of instruction, with TDI coming in second place. Most managers surveyed indicated that they plan to move in the TDI direction in the next year or two.
- Even though management viewed TDI as cost-effective, the survey showed that there was some resistance to using it.

The last finding is probably the most revealing. If TDI is gaining in popularity, why the resistance? For the most part, training department forays into TDI have been at the low end — video, audio or CBT. While this path is certainly the cheapest, it is also the least interesting for the user.

Time and time again it's been proven that a rich learning environment will stimulate the learner to absorb more and retain this new information longer. Thus,

information systems managers and trainers should look at each of the instructional methods and decide which would be the most effective.

**Video training.** These programs are usually characterized by what is known as "talking heads" and floating text on the video screen. The video camera pans in on the face of the lecturer (the talking head) half of the time, and the video screen is filled with a large image of a computer screen with text-based examples floating by the rest of the time. This sort of training is not sufficient for intensive instructional sessions. On the other hand, it's great for general "getting started" tutorials and refresher courses.

**Interactive video.** Interactive videos are definitely one step up from training videos. The student views a segment of the video and is then asked to respond to certain questions. Depending on his responses, the student jumps to a different segment of the video. Basically, this is self-paced instruction — but it still uses "talking heads."

**CBT.** This form of TDI is currently experiencing the largest growth, spurred by the increasing number of personal computer-based training products. If you go to a computer store, you'll find at least a dozen CBT products that can teach everything from word processing, the C programming language and typing. Here, the student interacts directly with the computer. But as interactive as it is, it's still text-based.

**Expert systems.** Expert systems have joined the fold of TDI. Increasingly, expert instructional systems are being

built with the purpose of providing much more than just standard instruction. The goal is to provide an automated expert so that the student is learning from a recognized master. At IBM's Sterling Forest, N.Y., facility, an expert system is being developed that can teach security guards how to fix broken security doors. The system can instruct guards in all facets of this technical task in a step-by-step manner.

**Multimedia.** The biggest bang for the TDI buck will come from multimedia. Multimedia is the latest buzzword on the horizon. It is about as high-tech as it gets, with a combination of video, audio, text and graphics that produce one integrated system. What this entails is all forms of TDI combined into one visually glorious and stimulating system.

**Instructor-led training.** The NTCP survey reveals that instructor-led training is the most popular method of teaching outside of the TDI realm. Therefore, why not take advantage of its acceptance through videoconferencing? If a company has a large number of employees to train, the norm has always been to offer the course many times to accommodate the large registration. While start-up costs for videoconferencing are high, in the long run, it is actually less expensive than paying for airfare and hotels when course locations are widely distributed.

High-tech training systems can help IS managers and trainers invigorate the learning process and put some pizzazz into corporate technical training. However, they must use the best method for each circumstance, or the trainees will lose interest — fast.

Keyes is president of New Art, Inc., a management and computer consulting firm in New York.



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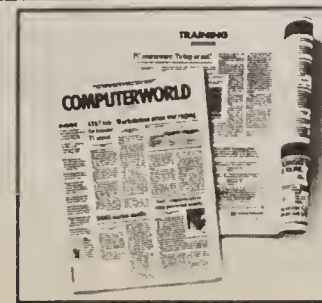
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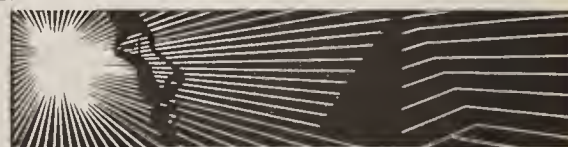
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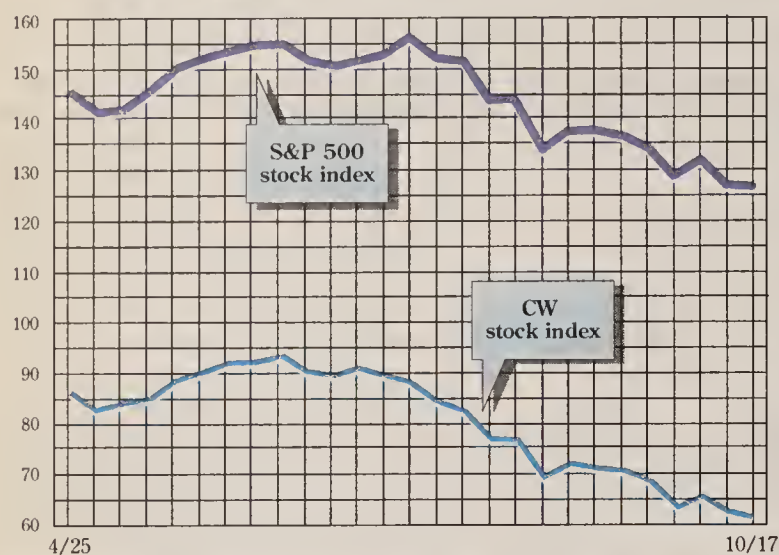
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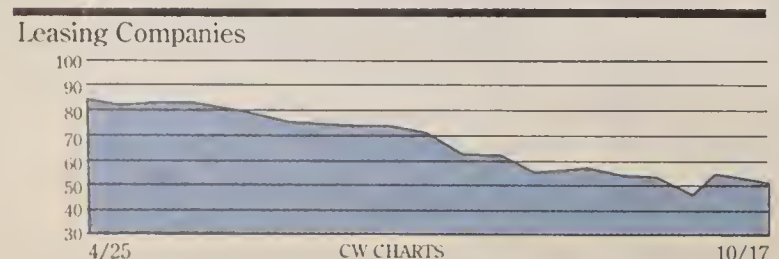
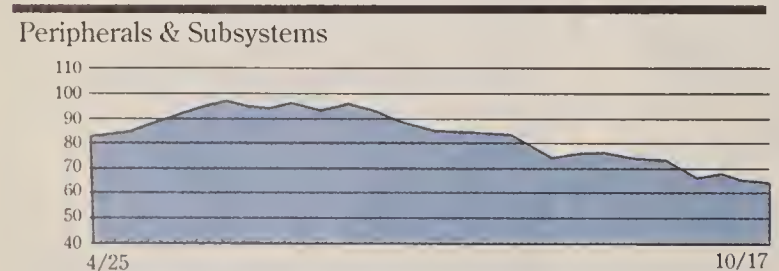
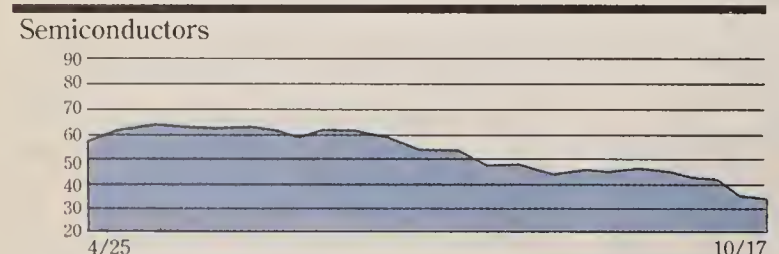
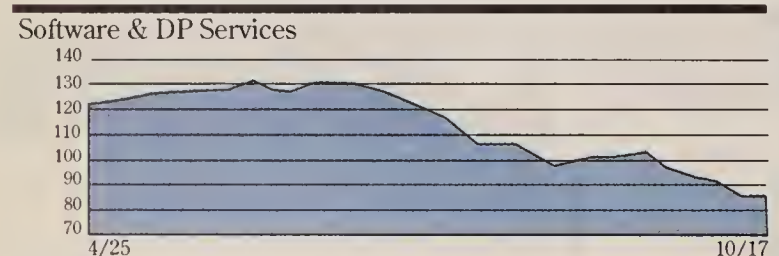
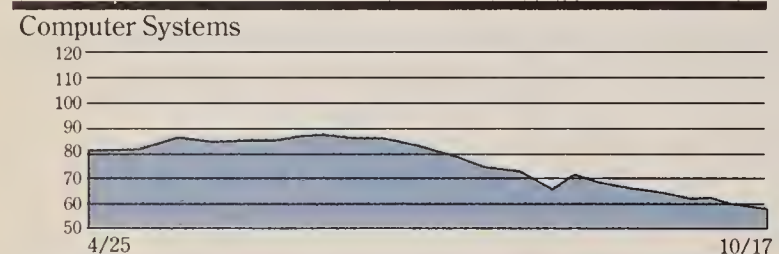
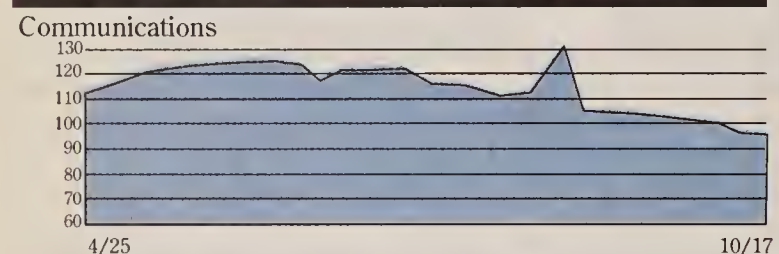
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# STOCK TRADING INDEX



Indexes	Last Week	This Week
Communications	96.9	95.1
Computer Systems	60.1	59.8
Software & DP Services	86.3	86.6
Semiconductors	36.3	35.5
Peripherals & Subsystems	67.3	65.6
Leasing Companies	53.6	50.4
Composite Index	61.8	60.5
S&P 500 Index	126.9	126.2



## Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, OCT. 17, 1990

EXCH	52-WEEK RANGE	PRICE OCT. 17, 1990	WEEK NET CHNGE	WEEK PCT CHNGE
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### Communications and Network Services

N	AMERICAN INFO TECHS CORP	68 53	63.5	1.6	2.6
Q	ANDREW CORP	26 16	16.5	0.0	0.0
Q	ARTEL COMM CORP	10 2	2	-0.4	-15.8
N	AT&T	47 30	30.875	-0.3	-0.8
Q	AVANTEK INC	5 2	1.688	-0.1	-3.5
N	AYOIN CORP	20 10	10.5	-1.0	-8.7
N	BELL ATLANTIC CORP	57 40	49.25	2.8	5.9
N	BELLSOUTH CORP	59 49	52	1.3	2.5
Q	COMPRESSION LABS INC	16 7	12.125	-2.4	-16.4
Q	CONTEL CORP	36 23	32.875	1.1	3.5
Q	DATA SWITCH CORP	4 2	2.875	0.0	0.0
Q	DIGITAL COMM ASSOC	27 9	9.25	0.0	0.0
Q	GYNATECH CORP	19 12	12.25	-0.4	-3.0
Q	FIBRONICS INTNL INC	13 5	6.5	0.5	8.3
Q	GANOALF TECHNOLOGIES	6 2	2.375	0.0	0.0
N	GENERAL DATA COMM INOS	6 2	2.125	-0.3	-10.5
N	GTE CORP	36 24	27.375	1.0	3.8
Q	INFOTRON SYS CORP	10 2	2	-0.3	-11.1
N	ITT CORP	61 40	41.125	-1.3	-2.9
N	MA COM INC	7 3	4.125	-0.1	-2.9
Q	MCI COMMUNICATIONS CORP	48 29	29.625	-2.9	-8.8
N	NETWORK EQUIP TECH INC	34 5	5.875	-0.6	-9.6
Q	NETWORK SYS CORP	15 7	8.75	0.1	1.4
Q	NORTHERN TELECOM LTD	30 21	22.75	-0.8	-3.2
Q	NOVELL INC	29 12	20.875	-0.6	-2.9
N	NYNEX CORP	92 68	71.125	-3.0	-4.0
N	PACIFIC TELESIS GROUP	52 36	44	1.6	3.8
A	PENRIL CORP	9 5	4.75	-0.1	-2.6
N	SCIENTIFIC ATLANTA INC	29 12	14.75	2.0	15.7
Q	SOUTHWESTERN BELL CORP	65 47	53.625	1.9	3.6
Q	3 COM CORP	19 6	6.625	-0.8	-10.2
N	US WEST INC	41 32	36	1.0	2.9

### Computer Systems

Q	ALLIANT COMPUTER SYS	9 1	1.5	0.0	0.0
Q	ALPHA MICROSYSTEMS	5 1	1.5	0.1	9.1
Q	ALTO MICROSYSTEMS	8 5	8.25	0.0	0.0
A	AMDAHL CORP	19 10	11.5	0.4	3.4
Q	APPLE COMPUTER INC	50 24	26.5	0.0	0.0
Q	AST RESH INC	26 8	16.5	-0.8	-4.3
N	BOLT BERANEK & NEWMAN	8 4	4.625	-0.3	-5.1
N	COMPAQ COMPUTER CORP	68 36	38.75	0.0	0.0
N	COMMODORE INTNL	12 5	5.875	-0.4	-6.0
Q	COMPUTER AUTOMATION INC	6 0	0.813	-0.2	-18.7
N	CONTROL DATA CORP	22 8	8	-0.5	-5.9
N	CRAY RESH INC	51 20	23.5	1.5	6.8
N	DATA GEN CORP	15 4	4.625	-0.3	-5.1
N	DATAPOINT CORP	5 1	1.375	0.3	22.2
Q	DELL COMPUTER CORP	14 5	9.75	1.1	13.0
N	DIGITAL EQUIP CORP	95 46	46.75	-0.3	-0.5
N	FLOATING POINT SYS INC	4 0	1.375	-0.3	-15.4
N	HARRIS CORP	38 15	15.375	-1.9	-10.9
N	HEWLETT PACKARD CO	51 26	27.75	-0.5	-1.8
N	HONEYWELL INC	112 71	75.75	0.9	1.2
N	IBM	123 93	100.75	-2.8	-2.7
Q	INFORMATION INTL INC	14 9	9	-0.1	-1.4
Q	IPL SYS INC	14 5	8.25	-0.8	-8.3
N	MAI BASIC FOUR INC	5 1	1.25	-0.3	-16.7
N	MATSUSHITA ELEC INOL LTO	167 116	148	9.9	7.1
Q	MENTOR GRAPHICS CORP	26 9	10.125	0.1	1.3
N	NBI INC	1 0	0.141	0.0	-9.6
N	NCR CORP	72 45	45.125	-8.0	-15.1
Q	PYRAMID TECHNOLOGY	36 14	16	0.8	4.9
Q	SEQUENT COMPSYS INC	34 13	18	2.3	14.3
Q	SUN MICROSYSTEM INC	37 15	21.5	3.8	21.1
Q	SYMBOLICS INC	2 0	0.313	0.0	0.0
N	TANOEM COMPUTERS INC	30 10	10.875	1.3	13.0
N	TANOY CORP	46 24	25.125	-0.3	-1.0
N	ULTIMATE CORP	10 3	3.25	0.0	0.0
N	UNISYS CORP	19 3	3.75	-0.3	-6.3
A	WANG LABS INC	6 3	2.875	-0.3	-8.0

### Software & DP Services

Q	AMERICAN MGMT SYS INC	20 11	14	0.0	0.0
N	AMERICAN SOFTWARE INC	18 8	8.375	0.8	9.8
N	ANACOMP INC	5 1	1.375	-0.4	-21.4
Q	ANALYSTS INTL CORP	24 10	11.5	1.0	9.5
Q	ASHTON TATE	15 5	6.875	0.5	7.8
Q	ASK COMPUTER SYS INC	10 4	5.25	0.6	13.5
N	AUTO DATA PROCESSING	60 44	48.875	1.9	4.0
Q	AUTOODESK INC	60 32	35.75	3.3	10.0
Q	BMC SOFTWARE INC	30 16	19.25	0.0	0.0
N	BUSINESSLAND INC	12 1	2	0.1	6.7
Q	COGNOS INC	10 4	5.5	-0.4	-6.4
N	COMPUTER ASSOC INTL INC	17 4	5.625	0.4	7.1
Q	COMPUTER HORIZONS CORP	17 8	11.75	0.8	6.8
N	COMPUTER SCIENCES CORP	59 37	38.25	-2.3	-5.6
N	COMPUTER TASK GROUP INC	12 8	8.125	-0.5	-5.8
Q	COMSHARE INC	25 14	15.5	-0.5	-3.1
Q	CORPORATE SOFTWARE	16 6	6.5	-0.8	-10.3
N	GENERAL MTRS (CLS E)	38 24	32.75	0.5	1.6
Q	GOAL SYSTEMS INTL	18 10	9.75	0.3	2.6
Q	HOGAN SYS INC	7 2	2.5	-0.1	-4.8
Q	INFORMIX CORP	18 4	5.375	0.9	19.4
Q	INTELLICORP INC	8 2	2	-0.6	-23.8
Q	LEGENT CORP	31 17	17.25	0.0	0.0
Q	LOTUS DEV CORP	39 13	14.5	-1.3	-7.9
Q	MICROSOFT CORP	81 38	56.5	-3.0	-5.0
Q	NATIONAL DATA CORP	35 8	8.75	-0.3	-2.8
N	ON LINE SOFTWARE INTL INC	11 5	4.625	-0.4	-7.5
Q	ORACLE SYS CORP	188 5	6.125	0.1	2.1
N	PANSOPHIC SYS INC	19 8	8	-1.0	-11.1
Q	PHOENIX TECHNOLOGIES INC	5 2	1.875	0.3	15.4
N	POLICY MGMT SYS CORP	43 30	34	-1.5	-4.2
Q	PROGRAMMING & SYS INC	25 12	13.75	0.8	5.8
Q	RELATIONAL TECH INC	10 3	8.625	0.1	1.5
N	REYNOLDS & REYNOLDS CO	27 12	12.125	-1.8	-12.6
Q	SAGE SOFTWARE INC	16 8	9.625	-0.3	-2.5
Q	SEI CORP	22 15	15.25	0.3	1.7
Q	SHAREO MED SYS CORP	17 12	15.375	-0.4	-2.4
Q	SOFTWARE PUBG CORP	28 14	16.75	1.0	6.3
N	STERLING SOFTWARE INC	11 6	6.75	0.8	12.5
Q	SUNGARO DATA SYS INC	26 15	15	0.0	0.0
N	SYSTEM CENTER INC	25 6	8.5	0.0	0.0
N	SYS. SOFT INC	29 13	16.75	2.9	20.7
Q	WORSTAR	2 1	0.813	-0.2	-18.7

### Semiconductors

N	ADV MICRO DEVICES INC	11 4	3.75	-0.1	-3.2
N	ANALOG DEVICES INC	10 6	5.75	-0.3	-4.2
Q	ANALOGIC CORP	11 8	8.25	0.0	0.0
Q	CHIPS & TECHNOLOGIES INC	25 6	6	-1.3	-17.2
Q	INTEL CORP	52 28	32	2.3	7.6
Q	MICRON TECHNOLOGY INC	16 7	7.375	-0.1	-1.7
N	MOTOROLA INC	88 52	54	1.0	1.9
N	NATL SEMICONDUCTOR	9 3	3.125	-0.3	-7.4
N	TEXAS INSTRS INC	44 23	24.375	0.1	0.5
A	WESTERN DIGITAL CORP	15 5	5.25	0.0	0.0

### Peripherals

Q	ALLOY COMP	2 0	0.375	-0.1	-25.0
N	AM INTL INC	6 1	1.25	-0.1	-9.1
Q	AUTO TROL TECH CORP	4 2	2	-0.3	-11.1
Q	BANCTEC INC	24 13	13.25	0.5	3.9
A	COGNITRONICS CORP	8 3	6	0.0	0.0
Q	CONNOR PERIPHERALS	31 11	17.125	1.5	9.6
A	QATARAM CORP	22 8	9.125	-0.4	-3.9
N	EASTMAN KODAK CO	45 34	37.125	2.1	6.1
N	E M C CORP MASS	7 3	6	0.4	6.7
Q	EMULEX CORP	9 4	5.125	-0.5	-8.9
Q	EVANS & SUTHERLAND	35 18	18.25	-2.8	-13.1
Q	ICOT CORP	2 0	0.375	-0.2	-33.4
Q	INTERLEAF INC	8 3	3.5	0.5	16.7
Q	IOMEGA CORP	6 3	4.188	-0.2	-4.3
Q	MASSTOR SYS CORP	3 1	0.563	-0.1	-18.2
Q	MAXTOR CORP	17 4	5.125	0.4	7.9
Q	MICROPOLIS CORP	10 3	5.25	-0.8	-12.5
N	MINNESOTA MNG & MFG CO	91 71	75.125	-0.8	-1.0
Q	PERSONAL COMP PRODUCTS INC	5 4	3.688	-0.1	-1.7
N	PRINTRONIX INC	15 6	6.375	-3.6	-36.3
Q	QMS INC	21 9	10.125	0.0	0.0
Q	QUANTUM CORP	26 9	14.5	0.3	1.8
N	RECOGNITION EQUIP INC	8 4	5	0.0	0.0
Q	REXON INC	10 4	4	-0.6	-13.5
Q	SEAGATE TECHNOLOGY	20 6	6.125	0.0	0.0
N	STORAGE TECH CORP	35 11	13.5	1.6	13.7
Q	TANOON CORP	4 1	1.688	0.1	3.9
N	TEKTRONIX INC	19 12	14.875	1.1	8.2
Q	TELEVIDEO SYS INC	1 0	0.25	0.0	14.2
N	XEROX CORP	63 30	30.75	-2.5	-7.5

### Leasing Companies

N	CAPITAL ASSOC INTL INC	5 1	0.75	-0.3	-29.4
N	COMDISCO INC	31 15	16.25	-0.5	-3.0
Q	LOI CORPORATION	18 11	10.5	-0.3	-2.3
Q	PHOENIX AMERN INC	5 3	4.813	0.0	0.0
Q	SELECTERM INC	7 3	3.5	0.3	7.7

EXCH: N=NEW YORK; A=AMERICAN; Q=NATIONAL

## High notes

### Tech stocks sing happy tunes after weeks of playing the blues

Many technology firms were singing good news last week, and positive earnings reports were beautiful music to the ears of stock market investors. Software maker Adobe Systems, Inc. warbled the loudest, belting out a 5¾-point gain to close Thursday at 24½; a great cast of other tech stocks also turned in star performances.

Hardware giant Digital Equipment Corp. announced quarterly earnings to the tune of 21 cents per share, higher than many analysts' expectations. DEC stock soared to 51 Thursday, up 4¼ points for the week. Rival IBM rang out with an increase of 5½ points to 105¾, and Compaq Computer Corp., proclaiming a new Intel Corp. 80386-based laptop personal computer and price slashes on desktop models, roared a powerful 5¼-point gain to reach 42.

Cray Research, Inc., after an abysmal recent performance, regained its composure last week and scaled up to 24½ — a climb of 2½ points. NCR Corp., however, screeched out a sour note among systems companies. Reporting a decline in domestic orders, NCR sank 3½ points for the week, closing at 46½.

Microsoft Corp., declaring big earnings gains, chimed in with Adobe in leading the software surge. Microsoft jumped 4½ points to 61½. Despite a 46-cent-per-share loss in earnings for Samna Corp., its stock hopped up to finish at 11½, up 2¾ points. Lotus Development Corp. settled its legal squabbles with Paperback Software International, Inc. and crooned a ¾-point gain to close at 15.

Among semiconductor firms, Intel scored consistent gains to add 4 points for the week, despite a minor setback in its dispute with Advanced Micro Devices, Inc. (AMD). Intel recorded a closing value of 34 points. AMD, meanwhile, dropped ½ of a notch to 3¾. Motorola, Inc. jumped 1½ points to 55¾.

MCI Communications Corp., absorbing network upgrading costs in its quarterly statement, plummeted 2½ points to 27½.

DEREK SLATER



## NEWS SHORTS

### DG contract probed

Data General Corp. has encountered another stumbling block on its way to deliver Aviiion Unix-based workstations to the U.S. Geological Survey. A much-needed \$127 million contract was restored to DG recently by the U.S. Circuit Court of Appeals for the District of Columbia. The contract, for 6,000 Aviiion workstations, was initially won by DG last December and suspended in March after losing bidders complained. The latest controversy involves the U.S. Department of the Interior's investigation into events surrounding a U.S. congressman's charge that aspects of the bid process were unfair. In other news last week, DG signed a five-year OEM agreement, worth as much as \$45 million, with Sprint International, a division of U.S. Sprint Communications Co. Under the agreement, Aviiion servers and workstations will be sold as enhanced components of Sprint International's private network and messaging system offerings.

### Bell Atlantic tries wireless networks

Bell Atlantic Corp. plans to start testing a telecommunications technology that could potentially allow the regional operating companies to set up wireless communications networks without having to pressure the Federal Communications Commission to reallocate radio frequency bandwidth already in use. The equipment, supplied by Omnipoint Data Co., will use spread-spectrum communications, which reportedly do not interfere with other transmissions on the same radio frequency bandwidth. Bell Atlantic said it will be testing other types of wireless communications during the next 12 months.

### NCR details networking strategy

As expected, NCR Corp. delivered its open systems-based networking architecture last week. The NCR Open Networking Environment is composed of four elements: an Open Systems Interconnect (OSI) backbone network, the NCR Open Network System (ONS), featuring application services such as X.400 message handling; AT&T Unix System V Release 4 interfaces for de facto industry communications standards such as IBM's Systems Network Architecture; protocol conversion products for moving from old network environments to OSI networking; and an OSI network management tool. ONS will be sold either as a stand-alone software system or as an add-on component to NCR's recently announced System 3000 line.

### Phony MS-DOS sweep

A police raid on a trading company in Taipei, Taiwan, last week cracked a sophisticated software counterfeiting ring that had allegedly distributed more than 30,000 copies of Microsoft Corp.'s MS-DOS operating system across Taiwan, North America and Europe. The search of Data State Corp. yielded 5,500 complete counterfeit copies of MS-DOS Versions 3.3 and 4.01, according to Microsoft.

### Sun shifts to AT&T Unix

In a step toward moving Sun Microsystems, Inc.'s hardware to the Unix International standard (based on AT&T's Unix System V) Sun announced a developers' platform last week. Sun's current Unix version is based on the University of California at Berkeley's Unix standards. Users' applications will be able to run on the new operating system without recompiling, according to Sun. A user version of the operating system is slated for 1992.

### Cray wins deal in Japan

Tohoku University in Miyagi-ken, Japan, has leased a supercomputer from Cray Research, Inc. in Minneapolis. A Cray Y-MP8 system will be installed at the university's Institute of Fluid Science before the end of this year. The computer and peripheral equipment is the first Cray Research system to be installed at a Japanese public university. Cray also announced last week that the NASA Langley Research Center in Hampton, Va., has ordered a second Cray Y-MP8. The used system is scheduled for installation at Langley in the fourth quarter.

## U.S. warned on security standard

BY MICHAEL ALEXANDER  
CW STAFF

A computer security advisory group will warn U.S. Department of Commerce Secretary Robert Mosbacher this week that a proposed European computer security standard would jeopardize the ability of U.S. vendors to do business abroad.

In a letter that is expected to reach Mosbacher's desk this week, the 12-member panel said that recent efforts by four European nations to push for a single computer standard pose risks for the U.S. computer industry because computer makers would be forced to develop two versions of the same software.

The U.S. already has a security standard for classified, military-related computer systems developed by the National Security Agency (NSA) and detailed in the so-called "orange book."

The Computer Security Act of 1987 mandated that the National Institute of Standards and Technology (NIST) develop guidelines to improve the privacy of sensitive information in federal computer systems. Those standards could be based on the proposed international standard, NIST officials said.

The advisory board was established under the 1987 security act to advise the NSA and NIST on computer security and privacy issues. "The acceptance of European standards would

certainly cause mischief, especially to the IBMs and DEC's of the world," which derive more than half of their revenue overseas, said Willis Ware, chairman of the advisory board. Ware, a noted computer security expert, is a member of the corporate research board at Rand Corp.

In September, Germany, France, the Netherlands and the UK asked for international comments regarding a proposed plan that is referred to as the international technology security evaluation criteria.

"Whether those four have enough unanimity or clout to bring along the rest of Europe remains to be seen," Ware said. "In 1992, when they have the united states of Europe, they are going to start acting like a cohesive group of states. They are serious about stacking the deck in favor of the indigenous computer industry."

The proposed European standards are based on the orange book criteria for classified, defense-related systems. However, the European plan would set security guidelines for military and civilian commercial systems.

"While it may claim to be in the spirit of the orange book, it is fundamentally different" in that it also aims to cover civilian systems, said Lynn McNulty, associate director for computer secu-

rity at NIST's National Computer Systems Laboratory.

Also, "there is no consensus within the government whether the orange book is ready to be taken into the international arena," McNulty said. The orange book, which is intended for classified computer systems users, will need to be retooled to fit the diverse needs of civilian computer systems users, he said.

NIST has come under considerable criticism in recent months for failing to develop computer security standards as outlined under the 1987 security act.

In a speech delivered earlier this month at the 13th National Computer Security Conference in Washington, D.C., Rep. Robert G. Torrocelli (D-N.J.), chairman of a U.S. House of Representatives subcommittee on transportation, aviation and materials, blasted NIST for its inactivity and for failing to take a leadership role in developing a civilian orange book that could be implemented here and perhaps abroad.

One NIST official, who asked not to be identified, conceded that the computer laboratory has made little progress in implementing the mandates of the security act but said that it lacked the funds to proceed as required by law.



## Crime

FROM PAGE 1

Army's Criminal Investigations Command and the Navy's Investigative Services Command receive little training in computer technology, spokesmen for both agencies said. The few agents who can be considered experts do not solely investigate computer-related crimes and are often required to assist in investigations that occur within territories that span continents.

None of the defense branches specifically track the number of computer-related crimes their agents handle, but they say that the crimes are on the rise.

"The potential for crime is increasing by virtue of the increase in the number of computers in every aspect of our daily lives," said Col. Patrick Letellier, deputy commander of operations at the AFOSI.

Each year, the AFOSI's computer crime agents investigate allegations involving millions of dollars, said Maj. Stephen Headley, director of public affairs.

"People thought computer crime was synonymous with fraud," said Jim Christy, chief of the AFOSI's Computer Crime

Division. "We're finding in the three OSI disciplines — general crimes, economic crimes and counterintelligence crimes — that computer crime and computer evidence is in all three of those disciplines."

Software piracy is so widespread, "I am not sure that we can handle it," Christy said. One investigation revealed that 35% of computer users had unauthorized files containing games, letters and resumes that took up 12% of the hard-disk storage space. Two people were also found to be operating part-time businesses.

### On the rise

Attempts by hackers from within and outside of the U.S. to break into Air Force and other military computer systems are also increasing, Christy said. Hackers' attacks on military systems "were not a major problem until recently," Christy said. "There weren't that many of what we call world-class hackers. What has happened now is that they're organizing, writing manuals telling the not-so-bright hacker how to break into a system. A 10- or 12-year-old can read and follow directions step-by-step and break into a govern-

ment computer."

In August, the AFOSI helped nab a 14-year-old boy who is accused of breaking into a superminicomputer at the Pentagon and downloading unclassified documents belonging to the Air Force. Although the pilfered files were innocuous, authorities were alarmed because previous intrusions by hackers have shown that such information collected over a period of time could be revealing, Headley said.

Also in August, an airman pleaded guilty to possession of at least 15 access codes with intent to defraud in a U.S. District Court in Pensacola, Fla. The airman was alleged to be a member of the Legion of Doom, a hacker group currently under investigation.

Foreign intelligence agents also routinely target computer systems, according to some analysts. Again, the problem is not being actively combatted by the military's computer experts. If an intrusion is detected, Navy investigators seek help from the users whose systems have been attacked or the Federal Bureau of Investigation, said Ernest Simon, deputy director of the fraud division of the Navy's Investigative Services Command.



# IBM brims with Q3 confidence

Observers question slack sales, comparison to poor '89 third quarter

BY NELL MARGOLIS  
CW STAFF

ARMONK, N.Y. — IBM last week reported a banner 1990 third quarter, but analysts and investors spotted a few red flags.

On its face, the report for the quarter ended Sept. 30 was upbeat. IBM logged a 27% net income increase to \$1.11 billion on revenue that was up 6.8% to \$15.3 billion. In addition, the company showed an after-tax margin of 7.3%, compared with 6.1% in last year's third quarter.

In a prepared statement, Chairman John Akers credited the healthy numbers to the company's ongoing restructuring and extensive product portfolio — the strongest in IBM history, he said. "Assuming no further deterioration in the world's economies," Akers added, "we continue to expect substantially improved financial performance for 1990."

## Eye-catching

Nevertheless, three points caught analysts' eyes. Hardware sales were down 1.5% year-over-year — a dip that resulted from a planned high-end product transition to the Enterprise System/9000 family, IBM told analysts during a teleconference.

Peter Labe, an analyst at Labe, Simpson & Co., said the sales line was further weighted down by weak personal computer-generated revenue in the

July-August time frame; PC sales rebounded in September, but not enough to counteract the summer sag.

IBM's omission of all reference to currency was disconcerting to several analysts. The weakness of the dollar over the past quarter, analysts said, provided a currency translation benefit to U.S.-based companies. Labe said an IBM financial executive refused to comment on any benefit from currency translations.

The glow on the quarterly report was also dimmed by the recognition that it was being compared with a poor 1989 third quarter, according to analysts.

During that 1989 period, IBM was hard hit by disk drive delays. That last week's figures shone by comparison, several of them said, relays more bad about last year's fall quarter than good about this year's.

On balance, however, analysts agreed that the third quarter was a solid one, if not the rave it initially appeared to be.

"Other than [hardware] sales, everything in this report is as I expected, or better," said Sanjiv Hingorani, an analyst at Salomon Brothers. Granted, "if you exclude currency," he said, "revenues would be lower — but that is one of the advantages of being a truly global player: Your markets can balance each other out, instead of leaving you vulnerable to one country's currency."

At Manufacturers National Bank in Livonia, Mich., First Vice-President of Information Systems Donald Vaughan echoed the sentiment.

"With a company the size of IBM, I'm not sure that it's meaningful to scrutinize everything on a quarterly basis," he added. "If they consistently had disastrous quarters, then we might

## Happier days

IBM's third-quarter profits edged up, recovering from last year's earnings dip

Third quarter	1988	1989	1990
Revenue	\$13.7	\$14.3	\$15.3
Earnings	\$1.2	\$0.88	\$1.11

(in billions of dollars)

Source: IBM

CW Chart: Marie Haines

get concerned."

Vaughan said he found Akers' bow to macroeconomic shifts a realistic observation rather than a dire portent. "If the whole world economy is in trouble, we're probably not going to run out and buy a new 3090," he said.

On the other hand, he added, even with economists widely acknowledging that the U.S. is nearing a recession, if it is not in one, and with several worldwide economies on shaky ground, the bank's IBM expansion plans are proceeding apace.

# IBM offers some AD/Cycle revelations

BY ROSEMARY HAMILTON  
CW STAFF

CHICAGO — IBM last week provided a few new peeks into its AD/Cycle strategy that showed its determination to promote applications development as a centralized, host-based operation.

At the first Repository and AD/Cycle user conference, held here, Robert Lord, a manager in the marketing strategy and support group at IBM's Santa Teresa Laboratory, layered on the following AD/Cycle details:

- There are no plans for a distributed repository.
- IBM will not provide a Repository Manager for the OS/2 platform, even though it is one of the four Systems Application Architecture (SAA) platforms.
- The company will not accommodate a three-tiered Repository Manager environment that would include a server as a middle layer.

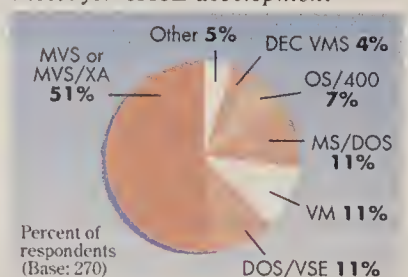
Some observers suggested that IBM's emphasis on large system-based applications development is not in tune with what

many other users want.

"If you talk even to the IBM AIX folks, they'll give you a different view," said Vaughan Merlyn, chairman of CASE Research Corp. "It's not consistent with the market."

## Lion's share

IBM's MVS/XA overwhelms other operating systems as the platform of choice for CASE development



Source: CASE Research Corp.  
CW Chart: Doreen St. John

An IBM executive who asked not to be identified said IBM's current AD/Cycle target is a shop with at least 100 programmers. "I think it's a fair statement to say that the Repository stays host-based," he said.

The executive said IBM will not build distributed capabilities

into Repository Manager. Eventually, the software will be able to access data stored in a distributed database environment, but it would remain a centralized manager of application development.

While the executive said he is aware that people have talked about OS/2 functioning as a Repository Manager host, he noted that it was never IBM's intent to bring the software down to the workstation level.

"That's inconsistent with SAA, and it is inconsistent with previous proclamations from other IBMers," Merlyn said. "This is IBM trying to sell what it has rather than create other avenues for people."

But the host-based strategy suits some users, such as the IS shop at Depository Trust Co., a mainframe shop with a heavy investment in AD/Cycle. "It fits with where I am going," said Emmanuel Ackerman, manager of data administration. "My workstation needs to be able to talk to the host session. I need a direct link to that."

# Repository

FROM PAGE 1

specifications next year. Systemview is intended to provide a similar overall framework for data center operations and systems management.

With different data models, AD/Cycle and Systemview would view and store data differently and therefore not easily share it. "I am very concerned about this," said Ted Gerbracht, group manager of technical services at Merrill Lynch & Co. "To gain the benefits of Systemview, I'd need one model, and then to deal with the other, I'd have to mount up a different model."

Emmanuel Ackerman, manager of data administration at Depository Trust Co. in New York, an early user of Repository Manager/MVS, said the difference between the two environments will not have a near-term effect on his shop but does raise questions as to how successful IBM will be with its enterprisewide, repository-based scheme.

"The grand view was [the repository] would hold everything for everybody," Ackerman said. "The grand view is a great idea, but what are they doing, cutting us off at the knees?"

A spokesman for Computer Associates International, Inc., which will offer products for both environments, said the company is not concerned about the data model inconsistency. He said CA will rely on IBM-provided interfaces to connect to the two architectures.

IBM officials said last week

the goal is to eventually make the two data models consistent but did not specify when.

Although IBM has a single grand plan for its strategic architectures, they are being developed by different teams on different schedules. As is the case with the data models, one group can sometimes get ahead of another, said John Sweitzer, a Systemview data model architect and Al Nisbet, a manager of AD/Cycle tools and services.

Systemview development began a few months ahead of AD/Cycle, the IBM executives said, and both models were originally based on an entity relationship concept, according to Sweitzer. However, Systemview developers changed directions this year and adopted object-oriented principles as outlined by the International Standards Organization's Guidelines for Definition of Managed Objects. Meanwhile, the AD/Cycle group had already committed to a release date of its model and had no choice but to proceed with its product.

"There are efforts now to look at the two models and remove redundancy and converge on a single view from an enterprise perspective," Nisbet said.

Despite IBM's promise to bring consistency to the models, at least one user of Repository Manager is disappointed by the current differences.

According to Gerbracht, the inconsistency could pose a big problem in Merrill Lynch's development and planning efforts. "The reality here is you've got one being built in Santa Teresa and the other in Raleigh," he said. "That's the problem."

# Repository Manager/MVS: A standard before its time

CHICAGO — Like DB2 before it, IBM's Repository Manager/MVS is on its way to becoming a standard long before a functional version is in the hands of many users.

The first Repository and AD/Cycle (RAD) user conference was held here last week, and close to 300 users attended, even though few of them have a Repository product from IBM.

Several attendees interviewed said they will likely install Repository Manager/MVS, the key software component of AD/Cycle, even though they do not fully comprehend it, nor have they evaluated other options.

"When IBM speaks, everyone listens," said Loren Thowe, a manager of data administration at Blue Cross/Blue Shield of Kansas. "Sometimes, it's like we're a bunch of sheep."

Thowe and other attendees said they came to the RAD meeting to learn more about the IBM AD/Cycle strategy.

"We still don't know a lot about this animal," said Cynthia Dwyer, senior data administration analyst at Amoco Corp.

## First things first

Dwyer said her staff intends to install Repository Manager/MVS in the future but does not have a specific date. For now, the firm is tackling associated management and staff issues.

The company recently selected information engineering as the corporate methodology and is finishing a dictionary project that called for finding all dictionaries in the company and determining what data was useless and what data should be migrated to the Repository Manager.

Other users, however, have just started on the AD/Cycle trek. "I'm hoping I can gain some insight," said Alan Richards, a senior applications support technician at Allen-Bradley Co. in Milwaukee.

ROSEMARY HAMILTON



# Netview pricing stymies users

BY ELISABETH HORWITT  
CW STAFF

RYE BROOK, N.Y. — Almost two months after IBM unleashed Version 2 of Netview on the world, users are just beginning to discover that they may have to pay a heavy price for the network management system's added functions and features.

IBM's revamped pricing structure is so complex that even IBM sales representatives are reportedly having difficulties figuring it out.

"We had a presentation by our [IBM branch salespeople] last Monday, and we sent them back with a lot of questions," said Jim Kane, a network management services staff member at Aetna Life and Casualty Co. "We have 17 independent Netviews, and we still don't know" whether they conform to the central, distributed or stand-alone options introduced with Version 2, Kane said.

Not all users will pay more for Version 2. IBM has introduced a graduated pricing structure that ties costs more closely to system size — which means price breaks for firms that are running Netview on low-end IBM hosts (see chart).

In addition, the mainframe portion of Netcenter, IBM's gra-

## A complicated web

*Not all Netview Version 2 prices are the same. Here are examples of what users pay for the latest incarnation of IBM's network management system*

**Netview Version 2 costs less than Version 1.3 for basic one-time charge for MVS/XA model group 18:**

Version 1.3: \$43,050  
Version 2 (central option): \$20,950

**but more for MVS/XA model group 50:**

Version 1.3: \$107,750  
Version 2 (central option): up to \$221,100

**A more graduated monthly pricing structure makes Netview Version 2 licensing costs less for VM/SP model group 10:**

Version 1.3: \$934  
Version 2 (central option): \$179

**but more for VM/SP model group 50:**

Version 1.3: \$1,260  
Version 2 (central option): \$3,190

CW Chart: Marie Haines

phics-based user interface, comes free with Netview Version 2, IBM said. Netview Version 1 users had to pay between \$45,130 and \$139,250 for the mainframe portion of Netcenter.

However, firms with multiple Netview hosts may see their charges increase by as much as 200%.

Licensing Version 2 from IBM would take a big bite out of The Travelers Corp.'s information systems budget, said Jim Oleksiw, telecommunications director at the insurance firm.

With his 1991 budget deadline looming ahead, Oleksiw recently tackled the Netview Version 2 pricing structure with a spreadsheet. He said he found that migrating to the new version would cost his company as much as 65% more per year in license charges, "if I run Version 2 the way I am now running Version 1."

Oleksiw originally thought the cost boost would be as much as 116% but revised that figure downward after talking with IBM representatives, he said.

One twist on IBM's new pricing structure is the division of Netview software into three categories, or options: central systems, which can act as focal points for other Netview hosts; distributed systems, which can manage some portion of a customer's installation and also feed into a central Netview; and stand-alone systems, which do not talk to other Netviews.

## Trimming down

By making the distributed option of Netview Version 2 significantly cheaper than the equivalent central option, IBM "influences you to have only one, or at most two, central systems instead of many," Oleksiw said.

For example, it would cost General Electric Co. approximately \$15,000 per month to put Netview Version 2 on three high-end central model group 60 hosts but only \$11,200 for one central host and two distributed hosts in the same group, Oleksiw said. "That's \$4,000 savings, which adds up over a year."

Several IS managers said that they have yet to fully analyze Netview Version 2's functionality and pricing to make a purchasing decision.

"A graphics interface would be nice, but we evaluated Netcenter two years ago, and no one wanted to pay for it," said Morty Eison, a voice and data engineer at First Boston Corp. in New York. Another Version 2 en-

hancement, direct LU6.2 support, "would also be nice, but I don't think we need it," he added. "We'll probably do an analysis and decide if it pays to migrate in the next few months."

Several users identified specific Version 2.1 and 2.2 enhancements that they would at least consider paying extra to obtain. Northeast Utilities is extremely interested in the fact that Netview Version 2.2, due out next spring, allows a much broader range of Netview commands to be sent down to an enhanced version of IBM's LAN Manager, according to Stan Pelletier, a computer scientist at the utilities firm.

"Those functions, in my eyes, are worth the extra cash, but I still have to sell it to management," Pelletier said.

None of the major IBM shops interviewed said they were seriously considering backing away from Netview entirely as a result of the price increases.

However, The Travelers will now "look twice at what we use Netview for" and more seriously consider moving network management functions to a local-area network-based platform, Oleksiw said.

IBM has been "approached by a number of customers who want to better understand how the new prices and structure changes affect them" and is working with such users individually, a spokeswoman said.

# Thrift bailout group faces systems scrutiny

BY GARY H. ANTHERS  
CW STAFF

WASHINGTON, D.C. — Congressional concern about Resolution Trust Corp.'s (RTC) information systems surfaced again last week at a hearing at which the agency charged with cleaning up the savings and loan mess was criticized for its lack of management information and its apparently haphazard approach to acquiring systems.

In March, Rep. Bruce F. Vento (D-Minn.), criticized RTC for lacking a system that would allow it and Congress to evaluate

procedures for systems necessary to meet its objectives.

RTC generally agreed with those criticisms but said it is creating those things in parallel with its systems development efforts. Last month, it answered a major GAO criticism by hiring its first IS chief.

During the next six years, RTC must dispose of an estimated 600 failed thrifts with assets of \$300 billion. So far, RTC has supported that task by cobbling together a number of personal computer-based systems and using systems at other federal agencies.

Meanwhile, the agency put out requests for bids for more permanent solutions, including one for a giant mainframe and telecommunications system to track the management and sale of the real estate inherited from

dead thrifts, which is estimated to number between 200,000 and 300,000 properties. A contract award for that system, called Real Estate Owned Asset Management System (REOMS), is expected in December, and the system is slated to be running by early next year.

## Faster, faster

RTC Executive Director David C. Cooke said that the need to quickly obtain data processing capabilities had dictated the agency's approach. He also said that an analysis of the agency's IS needs, performed earlier this year by Price Waterhouse, endorsed the approach of developing separate "feeder" systems and integrating them later into an "overall corporate database."

Cooke said that proceeding with the REOMS procurement before the IS framework is complete entails minimal risk. "There is some possibility that the strategic plan may come up with an entirely new approach, but that's very unlikely," he said.

However, Howard G. Rhile, a division director at the GAO, said, "Time is clearly a factor with RTC. But in developing systems, you either pay now or you pay later."

G. Brooks Dickerson, head of RTC's new Office of Corporate Information, said in an interview

that operational mandates leave him no choice but to turn the normal serial systems life cycle into a parallel process. In addition, he said he will seek to accelerate systems development by using prototyping, fourth-generation languages, highly portable software, software from other federal agencies and heavy use of contractors.

Dickerson said that development of the IS plan and architecture are a top priority for him and that they should be finished in December, at about the time an award for REOMS is made.

The REOMS solicitation asks for an asset management system with a number of features for budgeting, financial monitoring and marketing. It includes a mainframe computer and a nationwide telecommunications network to be accessed by 2,000 users, including RTC staff, financial institutions, other government agencies, asset managers and real estate brokers.

Cooke would not estimate the cost to acquire REOMS, but he said a rough estimate of the annual cost of operating and maintaining it was in the range of \$20 million to \$25 million.

Cooke said that procurement time will be about 10 months, compared with the two to five years typically required in other big federal government system purchases.

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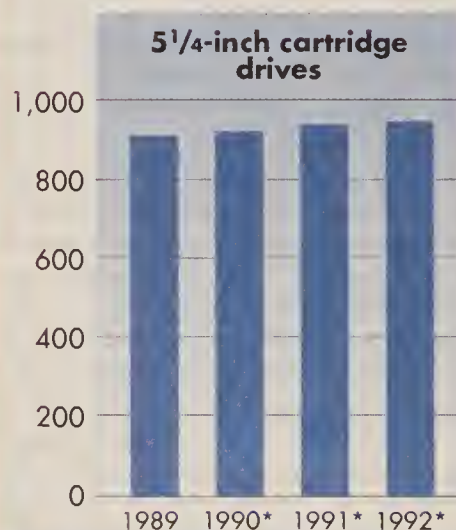
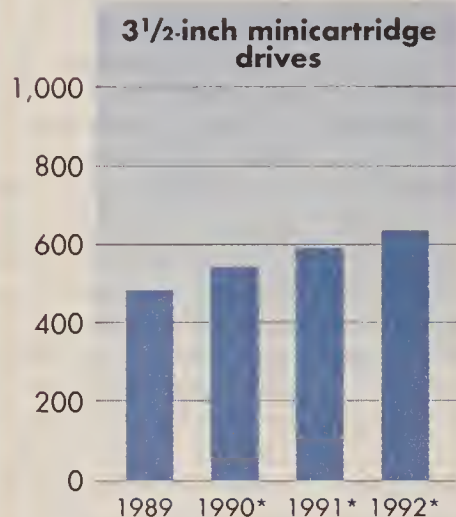
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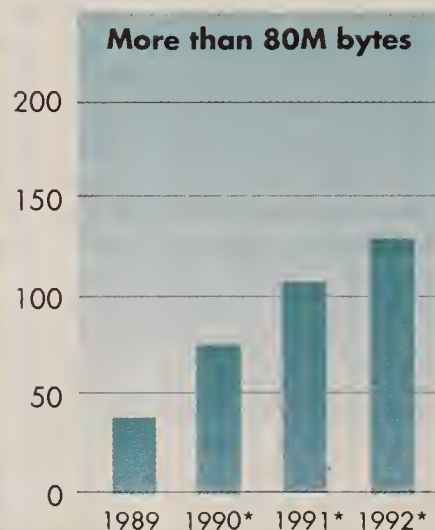
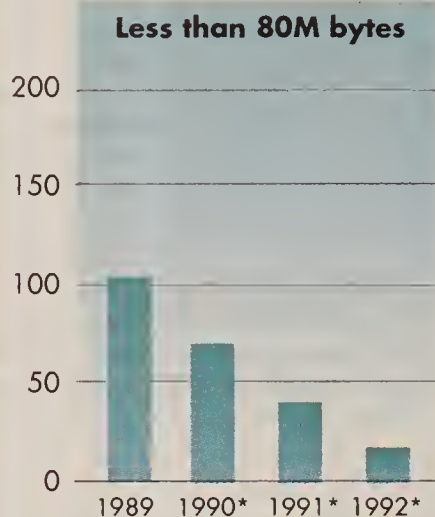
## Tape Drives

The markets for data cartridge and data cassette drives will continue to hold their own in the short term despite the optical threat

**Data Cartridge Tape Drives**  
Worldwide shipments (in thousands)



**Data Cassette Tape Drives**  
Worldwide shipments (in thousands)



Combined shipments of all classes of data cartridge drives are expected to experience 14% growth by 1992. Those drives in the high-capacity range — above 70M bytes for a minicartridge and above 80M bytes for a full-sized cartridge — will be in greatest demand

Market growth for cassette drives will be on the modest side; shipments are even expected to drop off after 1992

\*Projected

Source: Freeman Associates, Inc., Santa Barbara, Calif.

CW Chart: Doreen St. John

## N E X T W E E K

Even though many programmers and software developers consider themselves artists, reality suggests otherwise. New fears that the U.S. is trailing other nations in innovation has sparked a fledgling interest in creativity among IS professionals. See **In Depth** for simple techniques that can yield immediate results.



Philip Anderson

Product pricing can be a bloody business. Many a good product and good company have fallen as a result of miscalculations about how much customers will spend or just how low competitors' prices might go. Information systems can be a powerful weapon on the pricing front. Find out more about this in Executive Report.

## INSIDE LINES

## Sounds good to us

An Israeli virus tracker reports that a new virus, called the Saddam Virus, has popped up on bulletin boards in Israel. The virus apparently displays the following message on IBM Personal Computers and compatibles running MS-DOS 2.0 or higher: "Hey Saddam, leave quietly before I come." The virus, which is believed to be a strain of the Stupid virus (no kidding), is not widespread.

## By invitation only

Christmas Con, a confab of hackers, will get under way in Houston sometime in December, according to Micron, a hacker who knows about these sorts of things. The last hacker-con, held in St. Louis in 1988, drew the attention of the U.S. Secret Service, which spent much of the time secretly videotaping the event. This time around, all participants will be carefully screened, and no camera of any sort will be allowed, Micron said. "Anybody who is anybody" in the hacker underground will be there, he promised.

## Parlez-vous ISDN?

While a number of countries (including Uncle Sam) have bits of ISDN here and there, France Telecom will announce this week what it claims is the first "true end-to-end ISDN service" — in France, of course. When will ISDN become a transnational as well as an international networking standard? Tune in next year, or the year after that perhaps.

## Who's the fastest on the draw?

The New York PC Users Group last week entertained Borland Chairman Philippe Kahn and Lotus Chief Executive Officer Jim Manzi on different nights. The dueling duo proved they can cross swords in and out of the courtroom. Kahn warmed up the crowd by matching a speedy Quattro Pro with a sluggish 1-2-3 Version 3.1, but Manzi followed up with the speedier tongue: "Who knows what that Borland operator was trying to load up on Monday? It could have been anything from the New York City budget to Philippe's expense account. For either one, 14 minutes isn't bad," Manzi said, warming up for the kill. Manzi claimed it's actually much faster to load up or recall on 1-2-3 Version 3.1 but that the Quattro demonstrators didn't use the right keystrokes. "You'd think that by now, Borland would be more familiar with the 1-2-3 command structure," he zinged. Lotus is suing Borland for copyright infringement on 1-2-3's menu.

## Re-emulation

Phaser Systems, Inc. is working on software that would have IBM mainframes emulate Novell local-area network interfaces on its terminals. Executives at the South San Francisco, Calif., company say they could be within a year of evening out the micro-to-mainframe world. The result would be, among other things, the ability to manage Novell LANs from an IBM terminal.

## Last stop, the Computer Museum

Collectors have until Dec. 1 to pick up one of the remaining copies of the VP Planner spreadsheet family from Paperback Software International. "Some people will want to buy the product before it's gone, and it may be that other buyers recognize a good product," said a Paperback spokesman. And there is the possibility of a sympathy vote. "I suspect some new buyers may just be unhappy with the overall outcome of the litigation," he added, noting that Paperback feels the judge went too far in its ruling against Paperback in a copyright suit filed by Lotus.

Lotus kicks off a separate copyright trial against Mosaic Software this week. According to Lotus attorney Hank Gutman, Mosaic has conceded its twin spreadsheet was copied from 1-2-3 but claims that an unidentified Lotus employee gave verbal permission back at Comdex/Fall '84: "We refer to this as the 'visitation,'" Gutman quipped. You can visit here without fear of legal retribution. Confidential info can reach News Editor Pete Bartolik by phone (800-343-6474), by fax (508-875-8931) or via MCI Mail (address: COMPUTER-WORLD).



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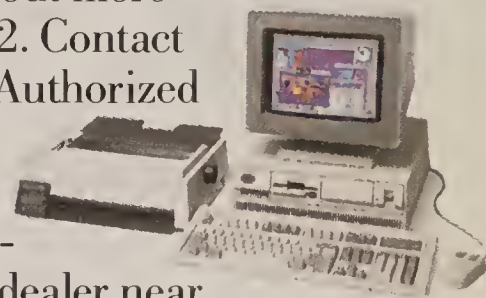
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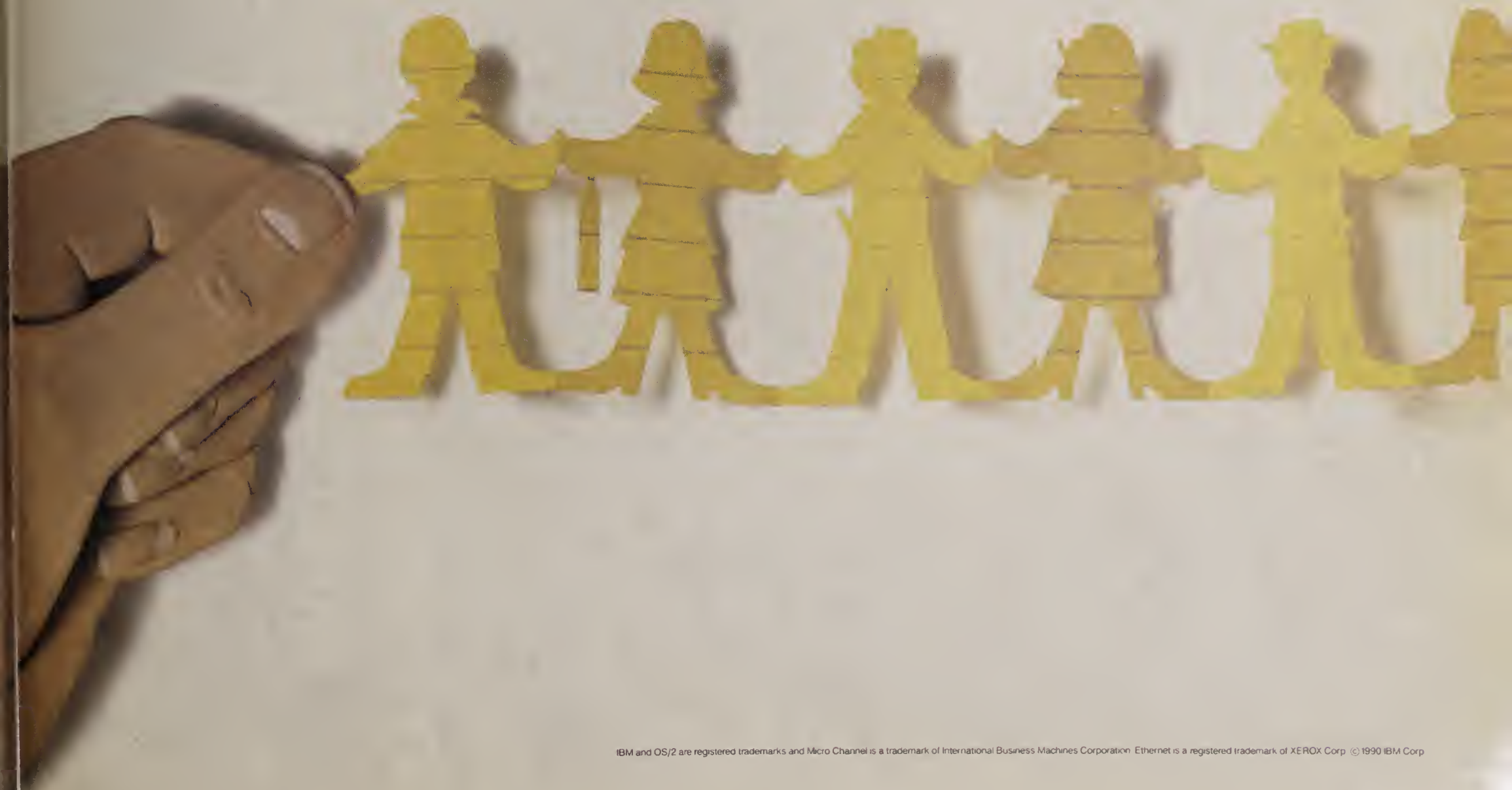
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